THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · Railway Official Gazette

33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1.

Telephone : WHitehall 9233 (12 lines). *Telegrams : "Trazette Parl, London"*

BRANCH OFFICES

GLASGOW: 87, Union Street . . . . . *Central 4646*
NEWCASTLE-ON-TYNE: 21, Mosley Street . . *Newcastle-on-Tyne 22239*
MANCHESTER: Century House, St. Peter's Square . . . *Central 3101*
BIRMINGHAM: 90, Hagley Road, Edgbaston . . . . *Edgbaston 2466*
LEEDS: 70 Albion Street . . . . . *Leeds 27174*
BRISTOL: 8, Upper Berkeley Place, Clifton . . . . *Bristol 21930*

Annually £4 10s. by post. Single copies, Two shillings.
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Editor : B. W. C. Cooke, Assoc. Inst. T.

Vol. 101] FRIDAY, JULY 30, 1954 [No. 5

CONTENTS

	PAGE
Editorial Notes	113
District Officers	115
Timber, Steel or Concrete Sleepers?	116
The North Eastern Railway	116
State Railway of Thailand	117
Revenue Prospects in East Africa	117
Letters to the Editor	118
The Scrap Heap	119
Overseas Railway Affairs	120
Indian Metre-Gauge Link	122
Locomotive Cylinder Performance—I	123
Production of Anti-Friction Bearings	125
Improving the Port Elizabeth - Johannesburg Main Line	127
Fastening Flat-Bottom Rails	129
German Federal Railway Passenger Stock	130
Personal	131
News Articles	133
Contracts and Tenders	137
Notes and News	137
Railway Stock Market	140

Railway Wages

IT is now well over half-a-year since the British Transport Commission and the three railway trades unions agreed, as a condition of the settlement of the wages dispute, to examine with the trades unions the whole wage and salary structure with a view to correcting anomalies and giving added incentives (including differentials) and to investigate all standard rates. Such a task, which is complicated by not a little rivalry between the unions, must take time, but it is disappointing that so far, relatively little progress has been officially announced. A measure of agreement is reported to have been achieved earlier this week on the general wages grades with which the National Union of Railwaymen is concerned. One obstacle to agreement has been lodging turns. The Commission rightly insists that a certain number of these are essential to efficient operation and the N.U.R. has accepted them in principle, but the Associated Society of Locomotive Engineers & Firemen has persisted in its opposition to them. Until agreement is reached on this point, no general settlement is possible. An essential of any new wages structure is differentials sufficient to encourage the more skilled and efficient employee and make worthwhile the acceptance of promotion to a higher grade. The relatively high wage rates of the lower grades make it a matter of great difficulty to accord the higher wages and salaries necessary for adequate differentials in view of the restricted financial resources available. British Railways must continue to pay their way, and additional sums for wages can only be found by increasing charges, which is undesirable, if not impracticable, or better still, by increasing efficiency. Discussion between the Commission and the unions, of ways to achieve the latter course was another condition of the agreement at the turn of the year, and many meetings have been held. With the changes impending in the Regional organisation of the railways, it would be a great advantage if a wages structure could be agreed before the new organisation comes into being.

Railway Reorganisation

A LEADING article in *The Reading Standard* last week made two points, among others, in commenting on the proposals for railway reorganisation embodied in the White Paper. The first point is that, instead of area boards being set up, the British Transport Commission should be increased by a considerable number of part-time members, analogous to the boards of directors of the former railway companies. The article does not say so, but this seems to imply that some at least of these part-time members would tend to specialise in one or more aspects of railway activity and serve on appropriate committees. The other point made is that the statement in the White Paper is wrong, to the effect that no profit and loss statement for a railway area can significantly reflect its revenue, expenditure, or managerial efficiency, because of the nature of operations of British Railways and of the volume of traffic not confined within one area. These factors existed, though to a lesser extent, perhaps, before nationalisation, and allowance for them was made in interpreting the railway companies' accounts. Area profit and loss statements would be of more than academic interest, especially in comparison between different years.

A £10,000,000 Loan for Rhodesia & Nyasaland

A £10,000,000 loan has been raised in London for the Federation of Rhodesia & Nyasaland. The new stock will bear interest at 4 per cent and will be redeemable in 1972 and 1974; the issue price is £97 10s. per cent. The proceeds of the loan will be applied to expenditure on projects which are being undertaken by the Federal Government and the Government of Southern Rhodesia in the financial year ending on June 30, 1955. These schemes form part of the £70,000,000 three-year development plan of the Federation, which, as explained in our July 9 issue, includes the expenditure of £17,500,000 on railway works in the Rhodesias and Nyasaland. The new loan follows less than a month after one for £3,571,000 raised by the Federation through the United States Foreign Operations Administration and intended to cover the purchase of material by Rhodesia Railways. When the development plan was announced at the end of last month, the Federal Finance Minister said that some capital was to be raised on the London market, though a contribution would be made by the Federation from its own resources.

Making Known the Facts

THE failure of many industrial employees to comprehend either the hard facts of the economic and trading position of this country or those of the firms for which they work, is stressed in a report by a sub-committee of the National Joint Advisory Council, representing the employers, the trades unions, and the nationalised industries. The report, which is published as a leaflet entitled "Human Relations in Industry," blames the Government, the Press and other organs that influence public opinion, and the managements of individual concerns. Good industrial

relations, it is pointed out, cannot be effective unless workpeople appreciate the economic situation. As regards the affairs of individual undertakings the report urges that the basic facts be made known to employees by special efforts, which, though they demand much of managements, will be repaid by the output resulting from realisation of facts, including the fact that the worker's real income depends on the national prosperity to which the efficiency and prosperity of his own undertaking are essential. With the railways, much has been and is being done by managements to make known the economic facts to railwaymen, but it cannot yet be said that more than a minority understands them sufficiently to be seized of the necessity for wages restraint.

Goodwill in Latin America

THAT there is a fund of goodwill towards Britain among the countries of Latin America is one of the conclusions reached by Sir George Nelson, Chairman & Managing Director of the English Electric Co. Ltd., as a result of his recent tour of that region. In an article in *The Times*, he points to the need for maintaining this goodwill as a prerequisite to trade. Foreign competition is severe, and the price level is undoubtedly being forced down by direct or indirect subsidies from some Governments to exporting firms in their countries. The trading position of the U.S.A. in Latin America is not as strong as is sometimes believed, but Germany, which regards Latin America as a traditional market, is working hard to recover it. The contribution of Great Britain, Sir George Nelson believes, should be in supplying items such as power generating plant, locomotives, rolling stock, vehicles, and modern machinery, and in the provision of finance and credit. The release of sterling to Brazilian importers, on which we commented in our issue of July 9, has facilitated exports of railway material from Britain to that country. It is to be hoped that opportunities for trade with other countries in this area will be grasped as they arise.

International Union of Railways Films Conference

FOR some years there has been held under the ægis of the International Union of Railways an annual meeting of those responsible for the production of instructional and documentary films by the various member railway administrations of the Union. The Swiss Federal Railways are responsible for this activity, and last month the meeting was held in Berne on their invitation. The British, French, German, Italian, Norwegian, Swedish, and Swiss railways were represented, and some 17 films were exhibited to the delegates and discussed. As an experiment, which proved highly successful, the conference this year was arranged to coincide with that of the I.U.R. information centre (C.I.C.E.) for which the Italian State Railways are responsible, and of which Signor Laloni is chairman. A notable feature of the meeting was the preliminary showing of a coloured film, jointly produced by four leading European railway administrations. Dr. Hugo Gschwind, President of the Swiss Federal Railways, welcomed the delegates and presided at the official dinner in Berne, also attending some of the film exhibitions. A technical visit was paid to the rolling stock exhibits at the "Hospes" Exhibition, then open in Berne.

Cape Midlands Line Improvements

ONE of the busiest routes of the South African Railways is the Cape Midlands line running inland from Port Elizabeth to the Orange Free State. A scheme costing over £4,500,000 is in hand to improve this line, which carries a heavy traffic to and from the north, much of it destined for the Rhodesias. Besides sharp curves and gradients as steep as 1 in 40, landslides have contributed to the difficulties of working and a considerable length of the existing line is therefore having to be re-routed. Nine tunnels, one of them the longest in South Africa, and six large reinforced-concrete bridges are necessary, and a large new marshalling yard is being laid out. The work is described in an article elsewhere in this issue, and particular reference is made to the means by which the rate of progress of boring and lining the tunnels has been increased When the work is completed loads permitted over the line will be raised from 450 to 720 tons for the same type of locomotive.

Diesels on Adelaide Suburban Services

DIFFICULTIES in making available sufficient funds and in obtaining materials and technical staff for the £7,000,000 Adelaide suburban electrification project, and the urgent necessity to improve and modernise existing steam services are reported to have been the cause of the decision by the Government of South Australia to work some services, at least as a temporary measure, with multiple-unit diesel trains. Some details of what is planned, including the construction of three six-car trains with bodies manufactured at the South Australian Railways workshops and engines and transmissions imported, are given on another page. Apart from the advantage of speed over the steam services, the diesels will afford an acceleration very similar to that of electric trains, and will share the advantages of working from either end, which will greatly help terminal working at Adelaide. If they prove successful, electrification may well be shelved altogether in favour of extended diesel passenger operation. If plans for electrification eventually were carried out, the diesels working the services concerned would be transferred to routes outside the electrified suburban area.

Elastic Rail Fastenings

A TYPE of elastic rail-to-sleeper fastening has recently been standardised on the French National Railways for use with both wooden and concrete sleepers. It was described in our issue of March 26, 1954; briefly, it consists essentially of a resilient rubber pad under the rail and spring holding-down clips secured to the sleeper by coach-screws or bolts. The advantages of this fastening, and others also, are now claimed for another type of elastic fastening, known as the Hey-Back, the subject of an article in this issue. In this case, however, the soleplate does not necessarily have a solepad, and it relies on a spring clip of special design, driven into a keyway between lugs on the soleplate and also bearing upon the toe of a flat-footed rail. The rail can thus be laid directly and rapidly on the soleplate and secured by driving the spring clips, much as steel keys are driven to hold bull-head rail in chairs. Other advantages claimed for the device are cheapness, a minimum of parts and of delays to traffic, adaptability to existing types of sleeper, maximum economy in renewal and maintenance costs and resistance to creep, and ease and rapidity of inspection. The fastening is in use on a length of the Metropolitan line of London Transport near Neasden.

Automatic Train Control

THE widespread extension of automatic train control, which has been a commitment of the British Transport Commission for some considerable time, is brought nearer to achievement by the announcement by Mr. Alan Lennox-Boyd, Minister of Transport & Civil Aviation, in the House of Commons last week, that the apparatus now under trial has shown an appreciable improvement during recent months. The need for apparatus of this kind was brought into prominence after the Harrow accident in October, 1952, and since then extensive trials of the equipment, which is based on a combination of the best features of the G.W.R. ramp system with those of the L.M.S.R. and L.N.E.R. inductive system, have been in progress over about 50 miles of the East Coast main line between New Barnet and Huntingdon. In his annual report for the year 1952, Lt.-Colonel G. R. S. Wilson, Chief Inspecting Officer of Railways, drew attention to the need for complete reliability in such apparatus, and Mr. Alan Lennox-Boyd emphasised that a system not wholly

reliable would increase danger. The Commission is evidently proceeding with as much speed as is possible, and the proposed extension of the trial stretch for a considerable additional mileage indicates that many problems have been overcome.

An Error of Judgment

THE serious bay end collision at Guildford on September 18, 1953, which was inquired into by Brigadier C. A. Langley, a summary of whose report appears in this issue, was caused by a motorman of experience mismanaging the combined electro-pneumatic and Westinghouse brake and then in his flurry actually applying forward power when he was attempting to reverse. This of course nullified such brake action as he had initiated and the train ran through the sand drag. The body of the first coach, dislodged from its bogies, crashed through a building, fatally injuring a relief assistant stationmaster and injuring the stationmaster himself and others. The report deals fully with the working and characteristics of the braking arrangements, a feature of the stock introduced in 1951 on the Southern Region lines, and details a number of tests made to check assertions advanced during the inquiry. There was no question of a failure of any part of the apparatus and the accident was attributable solely to the human element. Of course, if a driver or motorman makes a mistake when entering a terminal line, and comes to lose his head in consequence, there is practically no chance of avoiding an accident. We must admire, however, the skill with which trains are handled, day in and day out, without mishap at such places, often where space restrictions necessitate bringing them up to within a very short distance of the buffers.

Efficient Use of Steam

FOR some time past tests have been conducted with representative types of British Railways locomotives. A comprehensive review of the results of some recent tests is given in an article of which the first part appears on another page. This discusses, more particularly, aspects of cylinder performance when operating at different rates of cut-off and at varying speeds in r.p.m. The boiler steaming capacity of the locomotives under review is not taken into consideration, apart from the supposition that steam is uniformly supplied to the cylinders at the respective working pressures. Other points considered include the mean effective pressures developed; the influence of valve sizes on the mean effective pressures acting on the pistons; and the effect of boiler working steam pressures on cylinder power output. The need also is considered for more efficient means of distributing steam to the cylinders so as to improve both the power output and the efficiency of the steam locomotive.

District Officers

FOR many years it has been agreed that the district officer on railways in this country has responsibilities which entitle him to adequate remuneration and which make it essential for efficiency that his status and prestige should be such as to command the respect of his subordinates and of those outside the railways, whether railway users or suppliers of railway material, with whom he has to deal. Much of what has been said is no more than lip-service. Today, after so much stress has been laid on the importance of decentralisation and after certain increases in district officers' salaries since the war, neither their remuneration nor their status—in so far as the latter depends not on the man, but on what is accorded to him by his employers—can be said to be in accordance with their heavy responsibilities.

The importance of decentralisation to Chief Regional Managers has been much emphasised in the past year or so as an essential to efficiency which must accompany any major change in railway organisation. It is important that the process of decentralisation should not come to a halt at the Chief Regional Manager level. What may prove to be only a slight change in the formal powers of Chief Regional Managers, occasioned by the changes in railway organisation under the Transport Act of 1953 envisaged in the recent White Paper, will at least be a break, and, therefore, an opportunity of enhancing the status of the district officer.

The salaries of district officers even today compare badly with those of men with roughly comparable responsibilities outside the railways. Apart from the fact that, say, some £1,500 a year for a district operating superintendent of fairly average seniority is unlikely to afford him the reasonable ease to be expected by a man in such a position, such a salary would hardly enable him to mix on equal terms with those outside the railway who should be his equals. This is bound to have a hampering effect, and cannot be rectified by occasional entertaining on a stringently curtailed expense account. It applies more particularly to the district commercial officer, who depends on his good relations with the outside world for securing traffic. Nor is the prospect of such modest rewards attached to key positions achieved after many years of railway service, conducive to recruitment of the right type of ambitious young man. It is true that railway work, and more particularly perhaps, railway operating, demands something of a vocation, but to follow a calling with such comparative low emoluments for senior positions to which only a few entrants can attain, is a lot to ask. Civil and mechanical engineering and commerce moreover can offer careers outside the railway which, with whatever justification, may at least seem to the entrant to be more attractive than railway service.

The present salary scales for railway officers, even after increases since the war, are out of date. The reasons for these low salaries are many. They include conservatism; the false economies effected during the depression years of the 1930s, when some officers were induced to accept very low salaries; and, after the war, reluctance in a period of equalitarianism to improve the position of the leader. What also is affecting railway efficiency is the smallness of the differentials between the grades; this is aggravated by housing difficulties, which contribute to the refusal of promotion unaccompanied by an adequate salary increase, especially when the transfer of an officer may be to a place where living is more expensive. The only solution is to increase the remuneration of the higher grades of officer so as to ensure that differentials are big enough to outweigh any disadvantages which might be attached to promotion.

The status of the district officer depends largely on his subordinates knowing that he is, as far as they are concerned, "the boss." Further devolution of authority should go far to help in this respect. With discipline, a suggestion that deserves close consideration is that the district officer —with due provision for appeals to higher authority in serious cases—should be made solely responsible for the penalties awarded in all cases with which he deals. This may be considered dangerous, but at least those affected would know that the district officer, and nobody else, was responsible. Exceptions to this should be any offence involved in an accident where safety is concerned and which might be the subject of a Ministry of Transport inquiry.

The inclusion in a district officer's responsibilities of the selection of all staff in his department in his district, to include all below the rank of Assistant District Officer, also has been suggested as a measure which would increase his status. No abandonment is involved of the principle of freedom in application for vacancies. It is simply a case of the district officer, who should know the sort of man needed for the job, being solely responsible, and known by the more senior of his subordinates to be responsible, for choosing them for the tasks they perform. It is doubtful whether this would increase the risk of picking misfits, and any disadvantage probably would be outweighed by the benefit of the enhanced status of the district officer achieved by this decentralisation.

Timber, Steel or Concrete Sleepers?

ALMOST daily, railway administrations in one country or another are faced with the vexed question of the most economical and suitable form of sleeper for their systems. In the early days of railways, once the original stone blocks of the first "rail ways" had been discarded, timber sleepers were almost universally used either transversely or longitudinally under the rails. In some countries, however, it was found that suitable timber was difficult to procure at reasonable prices, and in many others, especially in the tropics, its life in the track was prematurely curtailed by the depredations of termites assisted by climatic conditions. In both cases this led to the use of metal sleepers, usually in the form of an inverted steel trough of one of the various designs, but in India the types generally adopted were cast-iron pots (or bowls) and flat plates with ribs and jaws, and iron or steel tie-bars between them to maintain the gauge.

As an alternative, but more particularly for general purposes of preservation, timber sleepers began to be treated with such preservatives as creosote, wolman or other salts, or mineral oil, usually mixed with creosote. Elaborate processes and treating plants were devised in which truckloads of sleepers were dried, placed in cylinders and there had the preservative forced into them under pressure. In some cases the cells of the timber were emptied under part-vacuum before the pressure application, and species of timber that did not readily absorb the preservative were usually incised suitably. These processes are still used almost universally for the protection of softwood sleepers, and even for harder timbers on the North American and other continents.

In recent years supplies of timber available for the vast number of sleepers required throughout most of the world have been seriously curtailed—partly due to the two world wars—and costs have risen so abruptly that, except in countries like America, Canada, Australia, Burma and Argentina, where large quantities are still obtainable locally, railways have had to search for alternative materials for their sleepers.

Cement is now available in most parts of the world and this has led to consideration of some form of concrete sleeper. The battering to which a sleeper is subjected under traffic has generally proved too much for the normal reinforced concrete sleeper, but with the introduction of pre-stressing methods, the prospects of concrete in this field are much more promising, especially if some form of resilient cushion is provided between rail and sleeper. It is significant that Western Germany, a former stronghold of the steel sleeper, appears to have capitulated to concrete, and this form of sleeper is now standardised. In France also two entirely different types are being extensively used with the now-standard type of rubber pad and flexible grip fastening. British Railways are laying large numbers of pre-stressed concrete sleepers, but not yet in high-speed main lines. The success or failure of the concrete sleeper can only be judged by many years' service under traffic, but the Continental countries already appear to be satisfied with the results obtained over the periods during which they have had experience of their various types, even under heavy traffic.

The concrete sleeper, though it would appear to outlive its wooden competitor as a rule, is heavier and generally more difficult to handle. Moreover, a road laid with either steel or concrete sleepers is less suitable than a wooden-sleeper track for track-circuiting. It must also be remembered that steel sleepers laid near the sea or in areas where the atmosphere contains corrosive ingredients are subject to serious erosion and deterioration. At any rate, the American Railway Engineering Association has declared against the reinforced-concrete sleeper, and so long as sufficient wooden sleepers are available it does not favour extensive trials with the pre-stressed variety. The resilience of wood has always appealed to the engineer and if its longevity could be assured against spike-killing, splitting, surface plate-cutting, climatic and other damage it would still hold its own in most countries so long as reasonable supplies and prices could be secured.

The relative costs of day-to-day maintenance of wooden, steel, and concrete sleepers are not readily comparable, largely because there are so many different types of fastening used with each, and it is mainly on the design and efficiency of the fastenings that this cost depends, either directly or indirectly. However, it is claimed that virtually no maintenance is required with the latest types of pre-stressed concrete sleeper, whereas the wooden sleeper certainly requires occasional attention irrespective of its fastenings. What are probably more important comparative considerations are the respective initial costs delivered at site and renewal costs dependent mainly on durability and longevity.

The North Eastern Railway

THE amalgamation which, a century ago, formed the North Eastern Railway, the largest in the country at the time, and still the fourth in mileage at the time of the 1923 grouping, brought into being a system which was one of the most progressive and initiated much that is now accepted railway practice. In his little book "The North Eastern Railway: A Centenary Story," Mr. C. M. Jenkin Jones presents the story of this great railway and the personalities who left their mark on it. He is well qualified to do so, for he rose to be Assistant General Superintendent of the North Eastern and became Divisional General Manager of the North Eastern Area of the L.N.E.R.

Sir Ralph Wedgwood in his preface, recalls the progressive staff policy of the North Eastern and its application of American commercial methods over fifty years ago, under the management of Sir George Gibb, of whom Mr. Jenkin Jones well says that "no better railway appointment can ever have been made." In referring to staff training, the author pays a merited tribute to Mr. Robert Bell, Assistant Goods Manager, and later Assistant General Manager of the N.E.R. and L.N.E.R., who was largely responsible for the educational facilities and training schemes established in the early years of the century.

Mr. Bell, in his own book "Twenty-Five Years of the North Eastern Railway, 1898-1922," has given us some personal recollections of the great figures that dominated the North Eastern scene in that progressive era. Mr. Jenkin Jones, tracing his story farther back, shows how fortunate was the North Eastern in its chief officers throughout its sixty-eight years of independent existence. In their hands the system exercised an almost complete monopoly that was never oppressive. In mineral haulage and dock ownership—it became the largest dock owning railway in the country—the North Eastern was pre-eminent. It began by controlling 44 acres of docks, but by 1923 this total had grown to 548½ including the King George Dock at Hull, jointly owned until 1922 with the Hull & Barnsley, the only railway to breach—with no great success—the North Eastern bastions.

In civil engineering the North Eastern could show such fine structures as the High Level and King Edward VII bridges at Newcastle and the Royal Border Bridge at Berwick, and its great stations at York and Newcastle were among the finest in the country. It was early in the field in applying electricity to signalling and traction. The electrification of the suburban lines from Newcastle to the coast in 1903-4 was followed in 1916 by that between Newport and Shildon, the first scheme in Great Britain for the haulage of heavy mineral traffic by electric power. With these schemes, Sir Vincent Raven, the last C.M.E. of the company, was prominently identified, and he was an advocate of the York-Newcastle electrification which was approved by the Board and might have come about but for the changed circumstances of the Grouping.

The practical monopoly of the North Eastern did not make its officers careless of their duty to the trader. The "sliding scale" whereby charges for the carriage of iron-making materials varied with the price of iron was an enlightened measure introduced as early as 1881. Soundness of management is exemplified by the constancy of the dividends which, from 1884 to 1922, with one exception, varied only between 5¼ and 7¼ per cent—an achievement

when one bears in mind the fluctuating character of the business on which the company's fortunes were based. By 1903 the 20-ton wagon was accepted by the North Eastern as standard for mineral traffic, and it was standardising on 12-ton wagons for goods when other railways were still building 10-ton wagons.

On its formation the North Eastern Railway was running the mail train between York and Newcastle on timings which were shown to be the fastest in England, and by the beginning of the 1914-18 war one of the Newcastle-Sheffield trains was booked to run between Darlington and York, 44½ miles, in 43 min. start to stop. In sixty years there were only three mechanical engineers—Edward Fletcher, Wilson Worsdell, and Sir Vincent Raven. North Eastern locomotives were always handsome and most of them were highly successful. Mr. Jenkin Jones selects for special mention Raven's " T2 " class 0-8-0 tender locomotive, which he calls a " master of its work."

State Railway of Thailand

THE report of the State Railway of Thailand for 1952, a copy of which we have received from General C. R. Seriroengritthi, General Manager, covers the second year of autonomous management of the system, which was formerly administered as a Government department. A new tariff came into force on February 1, 1952, but although rates were increased they remained lower than those in neighbouring countries.

Below are compared some of the principal results for the year and 1951:—

	1952	1951
Length of line open (km.)	3,333	3,272
Passengers carried	33,225,845	32,848,140
Goods carried (tons)	2,408,868	2,263,345
	bahts*	bahts*
Gross earnings	347,732,895	221,797,333
Total expenditure	283,408,212	199,205,461
Net income	64,324,683	22,591,872

(*£1 = 53 bahts)

The considerable increase in revenue is ascribed to the effect of the revision of the passenger and freight rates, coupled with the slight increase in the number of passengers and the tonnage of freight carried. The average distance travelled per passenger rose from 55·49 km. to 67·84 km. and the average fare paid from 3·43 to 4·22 baht. Rice showed the greatest increase in tonnage, 69,057 tons, of all commodities conveyed.

The total of steam locomotives remained constant at 412, but 18 more diesel locomotives, supplied by the Davenport Locomotive Works, U.S.A., and of the double bogie type, were placed in service, making a total of 44 diesel locomotives owned. Some 593 coaches and 6,129 wagons were in service or under repair at the end of the year. The reconstruction and extension of Makasan workshops, where the American-built diesel locomotives were erected, was carried on throughout the year.

Some 49 miles of line were relaid with 60-lb. rail. Structural works carried out included new station buildings at Utaradit, Chumphon, Pak Nam Poh, and Ban Phachi, and locomotive sheds at Paknam and Bang Sue. The reconstruction of the Rama VI, Ban Dara, and Surat Dhani bridges was continued; the Cleveland Bridge & Engineering Co. Ltd. was the main contractor and Dorman, Long & Co. Ltd. and Christiani & Nielson Limited were sub-contractors for the bridge work.

New lines surveyed totalled 632 miles, and 225 miles of line were under construction including doubling of the existing section between Ban Phachi Junction and Kaeng Koi, 22 miles, on the North Eastern line; aerial survey and photography were carried out. The reconstruction to State Railway main line standards of the Kanchanaburi-Thasao section of the wartime Siam-Burma Railway was continued and through running was made possible between Nong Pladuk (on the Southern main line), Kanchanaburi and Wang Pho, 71 miles, on April 1. The Meh Klong line, 42 miles long, and operated by the State Railways Department as an autonomous undertaking after the expiry of its company concession, was placed under the direct control of the State Railway and reorganised under the title of Meh Klong Railway Bureau.

In view of the growth of traffic and the urgent need for additional motive power and rolling stock, a committee, headed by the Minister of Communications, was set up to consider lists of requirements submitted to it by the railway and settle means of negotiating foreign loans to pay for the equipment decided on. The lists were approved subsequently in principle by the Council of Ministers and the State Railway prepared specifications for tenders. On the advice of the International Bank for Reconstruction & Development, a United States adviser was engaged for a year. The railways also had the services of an American accountant and an American mechanical engineer; the accounting system was altered to conform to that laid down by the Interstate Commerce Commission for Class I railways. Officers were sent to Britain, the U.S.A., and other countries for training in and study of operating, mechanical, signalling and other methods.

Revenue Prospects in East Africa

THE results of East African Railways & Harbours for the first six months of the current year—which incidentally have reached this country with commendable celerity—show that the approximate total revenue for this period was £7,377,000. Railway revenue for the month of June approximated to £1,233,000, compared with £1,212,000 for May.

Passenger earnings for the first half of 1954 are some 8·5 per cent less than 1953. Consistently throughout this year, passenger earnings have been less than in 1953. The emergency timetable introduced on the Kenya-Uganda Section with restricted daylight running, and the necessary curtailment of the through services to Uganda, undoubtedly account in large measure for this. The improved passenger services to be introduced on August 1 and further extensions planned to come into force next year, are expected to reverse this trend. Other factors which give ground for hopes of increased passenger traffics are the new third class coaches already in service on the Central Line in Tanganyika, with others to follow, and the new first and second class coaches to be placed in service in the coming months. Parcels traffic seems likely to have reached its peak and little further expansion is expected in the immediate future. There is, however, no reason to suppose that livestock traffic will not continue to increase, making its small but welcome contribution to the additional revenue.

The position with regard to goods traffic encourages a feeling of optimism. Railings to Mombasa Island were higher by some 22,000 tons in the first half of 1954 than in 1953, whilst railings from the island were also some 4,000 tons greater. The amount of general traffic railed up-country has increased by about 24,000 tons, a very substantial drop in cement forwardings accounting for the lesser increase in the total tonnage forwarded. With a more generous phasing policy the tonnage forwarded in the second half of the year ought to increase appreciably, and with it railway revenue. Traffic on the Tanga Line continues to be brisk, and to the end of June railings to Tanga were some 6,000 tons greater than last year. On the Central Line the position is not so encouraging. Exports have yet to come forward in quantity; but with a good cotton crop from the Lake Province and brisker movements in oil seeds, grains, pulses, and so on, the results for the whole of this year should be considerably better than those for the first six months.

Total revenue from harbours for the period January to May was £1,166,705 compared with £1,184,126 last year. The decrease is largely accounted for by the extraordinarily low tonnage landed in May, which was materially improved on in June.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Passenger Services in West London

July 24

SIR,—If the West London and West London Extension Railways were electrified throughout from Willesden Junction to Clapham Junction, bonding of the negative centre conductor rail with the running rails, as between East Putney and Wimbledon, would permit the services to be maintained by three-rail or four-rail stock. Alternatively, through working between three-rail and four-rail systems could be achieved by switchgear on the vehicles as on the Mersey-Wirral lines. With so many connections with existing electrified lines (London Midland, Southern, and London Transport) it might be possible to electrify quite cheaply without the need for new substations.

A simpler service than Mr. Treby proposes in his letter published in your July 16 issue would meet normal needs, and, if freight traffic were heavy, need not be continuous over the whole day. I would suggest a 15-min. or 20-min. interval service operating between Willesden and Clapham. St. Quintin Park Station is in ruins, and might be rebuilt further south near Viaduct Junction, permitting footbridge interchange with Latimer Road Station on the Paddington-Hammersmith line, and rendering unnecessary the restoration of the Edgware Road-Olympia service. Another new station near the crossing with the District line would permit interchange with West Kensington, and render the Earls Court-Olympia link unnecessary, except perhaps occasionally for the more important events at Olympia.

Stations south of Olympia all seem in quite good order, but restoration work at Willesden Junction High Level would be necessary, or the service could be worked to the main-line station using the back of the down fast platform. It is understood that the London Midland Region is considering demolition of platform 10 at Willesden High Level and taking up the permanent way, on the grounds that the Western Region is not likely to restore the West London passenger services.

Mr. Lewis's assumption, in his letter in your issue of July 23, that the diesel unit proved unsuccessful on the Belmont branch does not take into account that this "new diesel train," since its inception in 1952, has never been more than a few weeks in one place, and has now moved to the Higham Ferrers branch; on the other hand, the West London Railway, bounded by electric and steam services, hardly seems the right place for a new diesel venture.

The proposed withdrawal of a trolleybus route, if it is to be replaced by motorbuses, hardly seems to have any bearing on the subject, but the disposition of road bridges over the Thames favours a train service on the West London.

Yours faithfully,
R. G. R. CALVERT

10, Bolton Avenue, Windsor

Cross-Channel Services

July 22

SIR,—Some of your readers may be interested in the following account of my journey from Ostend to London on Friday, July 16.

The 5 a.m. boat from Ostend, by which I travelled, normally connects with an international train from Germany, but as this was anything up to 2 hr. late, the boat could not wait and left on schedule with a Belgian gentleman, his wife, and myself as the only passengers. At Dover, arrival 8.30 a.m., the porters, by their absence, were evidently aware of the number of passengers, but the usual number of security, passport, and Customs officers were on duty. I lost sight of my Belgian fellow travellers at Dover, and I was, apparently, the only passenger in the 9.20 train, comprising eleven bogie coaches, including a buffet car, arriving at Victoria at 11.22 a.m.

I realise of course that both the boat and the train had to leave according to schedule so as to maintain their return journeys. From my conversations with the officials at Ostend and Dover I think the foregoing is a unique experience.

Yours faithfully,
F. S. MIDDLETON,
Local Director, and Manager, Export Department

Thos. Firth & John Brown Limited,
P.O. Box No. 114, Atlas Works, Sheffield, 4

Publications Received

The North Eastern Railway: A Centenary Story. By C. M. Jenkin Jones. Published by British Railways, North Eastern Region, and obtainable from the Public Relations & Publicity Officer, British Railways, North Eastern Region, York. 8½ in. × 5½ in. 32 pp. Illustrated. Price 2s. 6d.—This study of the fourth largest pre-Grouping system has been brought out to coincide with the hundredth anniversary of its foundation on July 31, 1854, and contains a foreword by Sir Ralph Wedgwood. It forms the subject of an editorial article on page 116.

A Review of Productivity in the Pressed Metal Industry. British Productivity Council, 21, Tothill Street, London, S.W.1. 8½ in. × 5½ in. 29pp. Price 2s.—This pamphlet is the thirteenth in the series on various industries already issued by the British Productivity Council, the purpose of which is to survey developments since the war in the efficiency of the industry concerned. A British productivity team from the pressed metal industry visited the U.S.A. in 1949 and published a report in 1950. The report of the American team which made a return visit to the U.K. in 1951 was published in 1953. Many of the innovations dealt with in the Council's report sprang from these visits. Subjects dealt with in the review include materials handling, plant layout, safety measures, new techniques, and labour conditions. It also contains details of individual efforts made by 13 different firms to increase productivity. There are six plates.

The Third Woodhead Tunnel. By George Dow. Issued by British Railways, London Midland Region, and obtainable from the District Publicity Representative, British Railways, London Midland Region, 64, Cardington Street, London, N.W.1. 8½ in. × 5½ in. 28 pp. Illustrated. Price 1s. 6d.—This booklet is issued to commemorate the formal opening of the new tunnel at Woodhead by the Minister of Transport & Civil Aviation on June 3 last. In thanking all those who helped in supplying information for the booklet Mr. Dow specially mentions Mr. J. I. Campbell, Civil Engineer of the Eastern Region, under whose direction the tunnel was built. In addition to a clear map showing the railways approaching the tunnel, its transverse and longitions and drawings, showing views of the tunnel, its transverse and longitudinal sections, and the work in progress in it. The text will interest both the civil engineer and the layman. The historical notes chronicle events even earlier than the opening of the first single-line bore in December, 1845. The story of the building of the new tunnel is ably described and the electrification of the tunnel, the labour camp with its theatre and "temporary inn," and technical details of construction are among aspects included.

THE SCRAP HEAP

Built 1945—Museum Piece 1954

The last Shay locomotive to be built, Western Maryland Railroad No. 6, has been presented to the Baltimore & Ohio's new transportation museum at Mount Clare. Lima turned out the engine in 1945; her short life was spent on the 9·1 per cent grades and 23½-deg. curves of the Chaffee branch, climbing up to a now disused coal mine.—*Trains and Travel.*

"Listening Out for Trains"

Train-spotting clubs should be stamped out and books encouraging them should be banned, said a father at Stockport Juvenile Court. Before the court were seven boys aged 10-16 summoned for railway trespass. A police officer of the British Transport Commission said he saw one of the boys lying on his back in the middle of the main Manchester-London line at Adswood. Asked what he was doing, the boy said "I was listening out for trains."

Bygone Days on the Brighton Line

Early days on the L.B.S.C.R. are recalled by an article, "Early Railway Travel in Sussex" in the *Sussex County Magazine*, by Mr. H. C. P. Smail, a contributor to our associated periodical, *The Railway Magazine*. In the first instalment, in the July issue, six old prints are included; one of these, dated 1841, shows the original frontage of Brighton Station. Others depict the first train leaving Brighton for Shoreham in May, 1840, before the main line from London was completed; the London Road Viaduct, Brighton, surrounded by bare downs with only two houses visible; Arundel station in 1870; and 17 locomotives waiting to work return excursions from Brighton to London in 1871. The article reminds one that the tunnels on the Brighton line in early days were whitewashed and gas lit.

Brighter Locomotive Liveries

Why should locomotives be compelled to masquerade as sombre monsters? In reality they are light-hearted and highly individualistic creatures which do not deserve to be burdened invariably with dull colours. The days of the steam locomotive in Ireland are numbered; for, as time passes, they will be retired, to be replaced by diesel trains, which, for all their efficiency on long journeys, seem to lack personality.

Apart from the company's livery, the great locomotives of the past have had little opportunity to "go gay." Before their day is done—in Ireland and elsewhere—they ought to be allowed to enter into the spirit of carnival. Some could be painted with the civic colours of their destinations; others could be provided with murals on the outside of their boilers; and flags and bunting could be draped liberally from smokestack and cabin.—*From "The Irish Times."*

Railway Swans

The parents in a family of swans at a Northern marshalling yard chose to produce ten eggs in a nest built under the lee of the railway buildings, only a few yards from the inspectors' office, and nine hatched out. The cygnets were soon enjoying their young life to the full; the railwaymen took them under their wing, and threw bits of bread into their little stretch of water. The men had even helped to provide straw for the huge nest, a lodging good turn of particular charm.

All the same, the story ends in tragedy. The cygnets, reports the stationmaster, are all dead. "Perhaps the parents killed them; or perhaps they ate something poisonous—their pond isn't what you'd call clean. They've had better luck before. Last time seven hatched out, all grew up, and flew away."—*From "The Manchester Guardian."*

Stopping Train

A report in *Trud*, the U.S.S.R. trade union newspaper describes how a train on the Dnepropetrovsk-Moscow line kept on starting and stopping, and then travelling very fast. When stopped it was found that the driver, who was drunk, had jumped off. The fireman was also drunk. The driver was sent to prison for two years and the fireman for one.

Warning

Suggestions for traffic warning notices sent in by clergy to the *Church Times* include the following for a level crossing:

Our last gate-crasher went to wait
Outside a more exalted Gate.

Colour Blind?

So, A.B., your rhyming blade
Desires again to see the shade
Of many colours on the line
But will it keep them up to time?

I really cannot fathom out
Why so often people shout
That things of yore were always best
And that, reborn, they restore zest.

Do Swiss folk worry all the time
About the colours on the line?
Or are they proud they're in the bag
And proudly sport a *national* flag?

Do Italians moan and cry
That all their transport is awry
Because in years now long since dead
The lines were private-owned instead?

Do not the speeds of trains in France
The prestige of the routes enhance
Or do the workers without zest
Deplore the loss of Nord or Ouest?

And down in Spain how do they feel
About their neat expanding wheel
Which lets the wagons pass from Spain
To run through France and back again?

Is not the colour-motif yet
The dreams of those who won't forget
The things in working days they knew
—Of engines dressed in showy hue?

Is there not any thought or pride
When those old chappies take a ride
That "Everything is on the line,
The railways now are *really* mine"?

Or do they only pleasure show
When foreign countries have a go?

A. C. P.

[*Reproduced by permission of the proprietors of "Punch"*]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

VICTORIA

Fern Tree Gully—Gembrook Line

The locomotives and rolling stock of the 2 ft. 6 in. gauge line from Fern Tree Gully, terminus of an electric service from Melbourne, to Gembrook in the Dandenongs, 18 miles, are to be offered for sale. If not sold they will be scrapped, as there is no use for them on the two other 2 ft. 6in. gauge lines in the State, from Moe to Erica and from Colac to Crowes.

The Gembrook line, opened in 1900, was closed last year. It had long been unremunerative. The railways possess powers to widen the gauge and electrify the line and this work may be carried out when finances permit.

SOUTH AUSTRALIA

Multiple-Unit Diesel Trains

Multiple-unit diesel trains are to operate on Adelaide suburban lines as an experimental measure. Approval has been obtained for the construction of three six-car trains. Car bodies will be constructed at the South Australian Railways Islington Workshops, and only engines and transmission are to be imported. The trains will consist each of two three-coach units.

Although Adelaide suburban services are badly congested the proposal to use diesels is not intended to delay the proposed electrification, which is to be proceeded with. The diesel trains would eventually work on country lines. The existing steam suburban services are stated to be operated at a heavy annual loss, estimated at £1,500,000. This would be reduced by £647,000 a year by a cost of some £4,800,000; this compares with an estimated annual saving of £365,000 through electrification at a cost of over £7,000,000.

RHODESIA

New Works at Gwelo

Gwelo, already an important junction, is being developed and equipped as a major marshalling centre. By the addition within the past ten years of ten sets of new lines, the marshalling yards have been enlarged to just over three times their original size. Except for a necessary alteration from the Salisbury approach, all this work is completed.

A new locomotive depot has been designed and a mechanical coaling plant is to be installed. Work on this new plant is expected to begin shortly. A new carriage and wagon repair yard is in full working order. Formerly damaged stock had to be sent either to Bulawayo or Salisbury for repair. Other new buildings include a power substation, shunters' cabin, and a signals and telegraph workshop. A sodium lighting system in the marshalling yards facilitates work at night.

To make space for these new facilities the main line from Bulawayo has had to be deviated for ¾-mile. The earthworks entailed have not been great, but when finished will have involved the provision of about 80,000 cu. yd. of material.

Other railway plans for Gwelo include the removal of the cattle docks to a more suitable site, and the provision of new areas to increase facilities for handling goods traffic. A new station may be considered later.

Only 15 years ago not more than six trains passed each way through Gwelo in a day, and a passenger train arrived only three times a week. Now at least 15 trains a day pass through the station on the main line and a number on the branch lines. To what extent the new link with Lourenço Marques will increase its traffic remains to be seen, but it seems certain that the new facilities at Gwelo will be adequate to cope with developments for some years to come.

CANADA

Freight Traffic in 1953

Canadian railways moved 156,107,052 tons of revenue freight last year, or 3·6 per cent less than in 1952. The 1953 total was also less than that of 1951, when 160,252,638 tons were carried, but exceeded the movement in all other years including 1944, the high wartime year.

Reduced loadings in Canada were responsible for most of the decline last year from 1952, with a drop of 5,283,476 tons to 120,059,931 tons. There were reduced loadings in Canada last year of agricultural products, animals and animal products, forest products, and manufactures and miscellaneous products, the largest decrease in group totals being for forest products. Total loadings of mine products were larger.

UNITED STATES

Union Pacific Gas-Turbine Locomotives

Useful experience is being gained by the Union Pacific with its ten gas-turbine-electric locomotives, which have spent most of their time operating freight traffic over the 176 miles between Green River, Wyoming, and Ogden, Utah. Over a maximum gradient of 1 in 88 eastbound, up which they require assistance, and unassisted up 1 in 122 westbound, they have been handling 5,000-ton trains regularly, and No. 51 has covered 200,000 miles on these duties in 23 months, which for an experimental type is regarded as a good performance.

In favourable temperature conditions, one of the gas-turbine-electric units can develop more than 5,000 h.p., and is capable of out-performing a triple-unit 4,500 diesel-electric locomotive at speeds between 20 and 50 m.p.h., but with its fewer traction motors and lower adhesion weight the former will not handle as heavy a train at low speeds. In general, however, the gas-turbine-electric units have accumulated more gross ton-miles per train-hour than either their diesel-electric or steam rivals.

One of the gas-turbine-electric units has been operating on propane as fuel, stored under pressure in a 12,500-gallon tank wagon equipped to serve as a tender; the liquid propane has been vaporised by steam heat and supplied to the locomotive as a dry gas at about 150 lb. pressure. This unit has run 69,600 miles in seven months over the 330 miles between Las Vegas and Los Angeles, and has given every satisfaction.

BRAZIL

Brazil-Bolivia Railway

The Corumba-Santa Cruz line was inaugurated on July 11 by President Vargas of Brazil and President Paz Estensoro of Bolivia. This forms part of the new Brazil-Bolivia Railway, which was the subject of an article in our March 12 issue.

ITALY

Bologna-Ferrara-Venice Electrification

It is hoped to inaugurate electric traction between Bologna and Ferrara this year and between Ferrara and Padua next year, as stages in the Bologna-Venice electrification. The Ferrara-Rimini section is not being electrified, as stated in error in our November 13, 1953 issue.

FRANCE

Weed-Killing Trains

Six new weed-killing trains were ordered by the National Railways in 1952. Now in service, they consist of a locomotive with a control cabin at the front; a store wagon containing spare equipment, petrol, oil, and so on; a wagon fitted up as living accommodation for the crew; a workshop wagon containing the spreading apparatus; three tank wagons, the centre one including equipment for loading and mixing the chemical weed killer; and a brake van. The workshop van also contains an electric generator, and control equipment for the spreading apparatus.

The train has a crew of five, including the normal locomotive crew. A working speed of 31 m.p.h is possible, and on single-track line 75 miles can be covered in a morning, or on double-track line 112 miles of one track can be dealt with in the same time. Spreading of solution only takes place during the

morning, the afternoons being devoted to loading and mixing 15 *tonnes* of sodium chlorate. The cost of operation, including the crew's wages, averages fr. 4,700 a km. (£7 12s. a mile) of single line.

Later, it is hoped to couple four additional tank wagons containing concentrated solution to the train so as to increase the radius of action and to reduce the time taken to prepare and mix the solution.

Servicing Wagons-Lits Stock

The International Sleeping Car Company has opened in Paris a new central store for the issue of provisions and other stores required by the Pullman and restaurant cars. Stores required by any train are sorted out at the central store and despatched by lorry to the railway servicing point.

The store has been named the Raoul Dautry Building in honour of M. Raoul Dautry who was General Manager of the French State Railways from 1928 to 1937, and Administrator of the French Atomic Energy Committee at the time of his death in 1951.

As indicative of the size of the new centre, it is expected to handle annually nearly 500 tons of meat, 150 tons of fish and 300 tons of bread.

SWITZERLAND

H.F. Telephony on Private Lines

After its successful application on the Chemins de fer des Montagnes Neuchâteloises, a system of high-frequency telephony developed by Hasler S.A., of Berne, has been installed on the privately owned Jura Railways from La Chaux-de-Fonds through Noirmont to Glovelier, and from Noirmont to Tavannes. These sections have each their own frequency with automatic intercommunication.

Each station can be called by dialling the number allocated to it and all stations simultaneously by dialling a common number. Communication with the Porrentruy-Bonfol section is made over the Federal Railways telephone system. Locomotives and motor coaches are equipped to receive and transmit messages in the same manner as stations and should a train become stopped between stations for any reason, the fact can be notified immediately and assistance summoned if necessary.

SWEDEN

Single-Line Signalling

The three-mile single-line section between Gashaga and Aga on the Stockholm-Södra Lidingö line, has been equipped with automatic signalling to avoid the heavy cost of doubling. Until November, 1953, the service was half-hourly but thereafter was made twice as frequent in the rush hours. With a few goods services there are now 110 trains daily in both directions and the maximum speed is 37 m.p.h. There are three crossing places but no booked crossings in the timetable. An approaching train always runs to the same line and loop points return automatically to normal 15 sec. after a train in the opposite direction, for which they have to be reversed, has cleared them. A home signal at a crossing station ordinarily shows green but changes to red if the points move from the normal closed position. It would be possible to increase the service to 12 trains per hour in both directions or 20 if a fourth crossing place were provided.

Signals are controlled on the principle used in single-line automatic signalling elsewhere under which the first train to approach a section secures the right of way for itself and holds the opposing starting signal at danger. The usual Swedish signal aspects are used under which the approach to a red signal is indicated by a flashing green light. The experience obtained last winter with this installation gave every satisfaction.

AUSTRIA

Semmering Line Centenary

The centenary of the railway across the Semmering, completed in July, 1854, has been celebrated by Austrian engineers in the presence of the Federal Minister of Transport, and on the Semmering itself by a gathering addressed by the President of the Republic.

The official journey of the Austrian engineers (*Zeitschrift des Osterreichischen Ingenieur- und Architekten-Vereines*) has marked the occasion by publishing a special number in which is reprinted the speech by Dr. B. Ostersetzer of the Federal Railways on the occasion of the engineers' meeting. Dr. Ostersetzer points out that the chief claim to fame of the railway is that it proved in the face of scepticism and even hostility that it was possible with adhesion working to overcome the heavy gradients on a mountain railway.

The mountain section, between Gloggnitz in Lower Austria, and Mürzzuschlag in Styria, is just over 25 miles long. There are 15 tunnels aggregating about 2½ miles in length. The old summit tunnel is nearly a mile long and the aggregate length of the 16 viaducts with 81 spans is also about a mile. The maximum gradient on either side of the summit tunnel is 1 in 40. Almost exactly one half of the total length is in curvature.

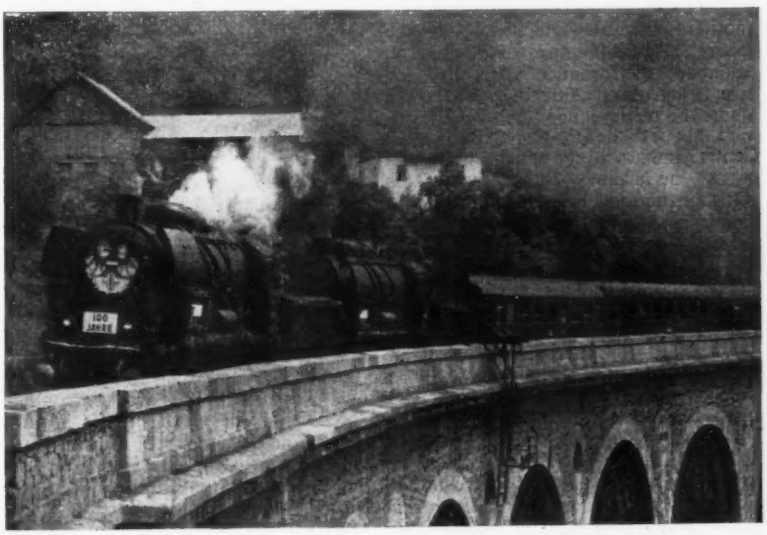
The construction itself was a remarkable feat. Up to 20,000 workmen were engaged at one time and about 4,500,000 cu. yd. of earth and rock had to be moved. A particular feature was the amount of masonry required. The difficulties of tunnel construction which eventually, nearly 100 years later, led to the construction of a second tunnel and the conversion of the old tunnel into a single-track tunnel, were described in our issue of March 30, 1951.

Apart from the crossing of the mountains and the creation of a direct railway between Vienna and Trieste, the construction of the Semmering line had a great influence on the development of railways generally, particularly on tunnelling methods and locomotive design. The original locomotives were supplied by Cockerill and Kessler to specifications prepared by Wilhelm Freiherr von Engerth on the basis of a contest in 1851.

HUNGARY

Gas by Train to Villages

Natural gas is to be supplied to provincial villages and towns by train. A service using twelve tank wagons each holding 7,500 cu. m. will begin next year. Gas will be pumped into a storage plant in the place served. It is stated that each wagon will make possible an annual saving of 8,300 tons of coal.



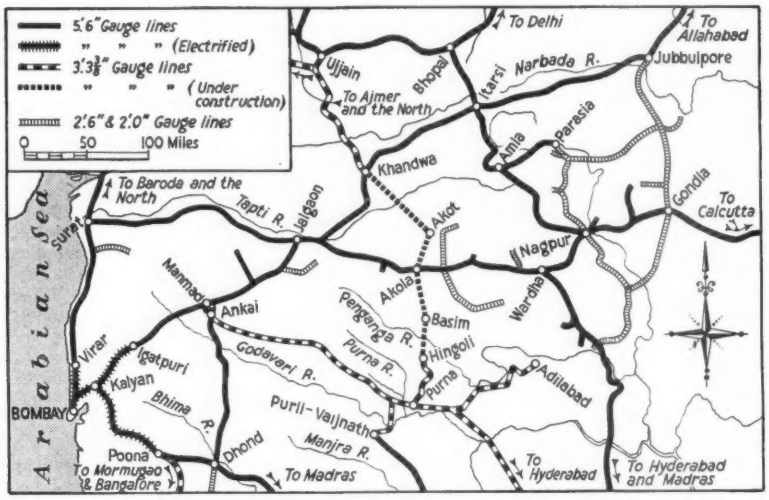
Special train on the Semmering line, Austria, decorated to commemorate the centenary of the opening of the route

Indian Metre-Gauge Link

Construction of 187-mile connection between northern and southern systems

THERE has always been a gauge-question in India, and the latest official figures show that on March 31, 1953, there were 15,755 route-miles of 5 ft. 6 in. gauge, 15,182 route-miles of metre gauge, and 3,337 miles of 2 ft. 6 in. and 2 ft. gauge railway in that country.

The broad-gauge system is spread as an integrated unit all over the country except in the extreme southern, eastern and western districts. On the other hand, there are two separate metre-gauge systems, one in the north with a mileage of approximately 10,000, and the other in the south with about 5,000 miles. The nearest points at which these two systems approach one another are at Khandwa to the north, and Manmad, Hingoli, or Adilabad, the distance apart in each case being about 200 miles. At these points the metre-gauge line to the north was that of the Bombay, Baroda & Central India, and that to the south was part of the Nizam's State Railway. This gap has for long been recognised as a handicap to operation of both systems, necessitating the transhipment of stock on broad-gauge wagons when interchange was desirable.



Railways in West-Central India, showing the connection being formed between the metre-gauge systems of the North and South

Early North-South Link Proposals

A connection between north and south was suggested as long ago as 1882, and several surveys were undertaken between then and 1911, when a line from Khandwa to Hingoli was finally located. Because the railways serving these two terminals were under different administrations (Khandwa being served also by the broad-gauge Great Indian Peninsula Railway, through whose territory the new line would run) and as a result of two world wars intervening, the scheme lay dormant until the constitution of the Central Railway in November, 1951, when both sections of railway came under this administration. Further investigations confirmed the 1911 alignment via Akot, Akola, and Basim as being the most suitable, with the result that the construction of the 187¼-mile link was sanctioned by the Railway Board, and in March, 1954, the Minister for Railways & Transport, Mr. Lal Bahadur Shastri, inaugurated the work.

The new line will open up some of the most fertile country in Berar and tap the three intermediate markets and trade centres just mentioned. It does, however, traverse the Satpura ranges, involving some heavy earthworks. Three major bridges will also be necessary to cross the Tapti, Purna, and Penganga Rivers.

Benefits from New Link

The estimated cost of the construction is about Rs. 10 crores (£7,500,000), but the expenditure of this sum is considered to be amply justified by the important operating and commercial benefits which it will secure. Incidentally, it will provide a through metre-gauge connection from Bhatinda and the Punjab frontier area bordering on Northern Pakistan, and Trivandrum and Tuticorin at the extreme southern toe of the peninsula. An all-India metre-gauge wagon pool in place of the existing northern and southern pools will also greatly improve transport throughout the country.

At the ceremony held at Khandwa on March 17, in the presence of the Chief Minister of Madhya Pradesh, Pandit Ravi Shanker Shukla, of distinguished guests from surrounding States and a number of senior railway officers, Mr. Lal Bahadur Shastri, at the foot of the ceremonial dais, turned the first sod on the new alignment with an electro-plated spade.

Mr. Shastri said in an address that when he first took over the portfolio of Railway Minister he had to consider the various projects and decide which new lines should be built first. At a meeting of the Central Transport Board, proposals for several new lines in various provinces had been considered. The problem was difficult, for if a particular province was selected for the alignment, the population of that province would be pleased and that in others would be disappointed. First priority was given to the Khandwa-Hingoli project not only because it was essential to Madhya Pradesh but also for the whole of India. Land acquisition would be a problem and in this respect he looked to the Government of Madhya Pradesh for assistance in settling these matters expeditiously.

Continuing, Mr. Shastri said that the work would engage senior officers, engineers, hundreds of clerks and overseers, and thousands of labourers, between whom co-operation was essential. Referring to the second Five-Year Plan, he said that provision had been made for doubling and building of new railway lines in India with a mileage of 2,000, which would not be difficult if the work progressed steadily. Funds and materials were required and they were not getting enough steel. A steel plant was to be started which might take four to five years to complete. Meanwhile the works would have to be completed with imported material.

BATCH-TYPE CARBONITRIDING FURNACE.—The General Electric Co. Ltd. has designed a special batch-type furnace for producing a hard case on steels by carbonitriding, the treatment temperatures for which are some 100 deg. C. lower than those used in normal carburising practice. It is a horizontal furnace in which the complete process, including oil quench or, alternatively, cooling in the carbonitriding atmosphere, may be carried out without exposing the charge to air and without cooling down the heating chamber. The furnace is arranged for front operation. It has, in addition to the heating chamber, a purging section, an oil quench tank, and a cooling chamber. The doors and quench gear are operated hydraulically. Both the cooling chamber and the quench tank are water cooled and the latter is fitted with agitating propellers. The heating chamber has totally enclosed tubular elements. Small parts can be processed in wire mesh baskets loaded on a grid carrier tray, which is moved in and out of the furnace manually from a charging table.

Locomotive Cylinder Performance—1

Consideration of test results of representative British types

By E. C. Poultney, O.B.E.

THE comprehensive experiments which have been conducted by British Railways with various steam locomotives have been useful in presenting data on the overall performance of modern examples of motive power and on the steaming capabilities of boilers and the powers developed in the cylinders at different rates of steam admission and at various speeds in terms of m.p.h.

In addition, particulars of the hourly rates of cylinder feed also are given, with the temperatures of the steam as supplied to the cylinders. The object of this article is to examine the cylinder performance of representative modern locomotives when operating at different rates of cut-off per cent and at varying speeds r.p.m., considering more particularly:—(*a*) The mean effective pressures developed at varying rates of cut-off and speed; (*b*) the influence of valve sizes on the mean effective pressures acting on the pistons; and (*c*) the effect of boiler working steam pressures on cylinder power output.

The experimental data used as a basis for this analysis are taken from the official Test Report Bulletins, Nos. 3 and 5, on the performance and efficiency tests of a 2-6-0 type London Midland Region class "4" locomotive and a 4-6-2 type British Railways class "7" standard locomotive.

For present purposes, boiler steaming capacity is not taken into consideration beyond the supposition that steam is uniformly supplied to the cylinders at a given working pressure. In such conditions, it follows that the mean effective pressures developed at prescribed rates of admission and assumed speeds measured by the revolutions made per minute by the driving wheels will depend only on the cylinder design, more particularly the port dimensions and the efficiency of the steam distribution obtained by the valve actuating gear. At any rate of working, as outlined, it is the function of the cylinders to develop mean effective pressures which, in turn, determine the tractive force available to haul trains.

Further, for any given train load, the higher the average speed required by operating schedules, the greater must be the mean pressure indicated in the cylinders, while at the same time economical operation requires that the mean pressures desired should be obtained at relatively early rates of cut-off in order to efficiently utilise high pressure superheated steam. The tractive force exerted by a simple expansion two-cylinder locomotive is given by the well-known formula, which may be written as under:

$$\left(\frac{d^2 \times L}{D}\right) \times Pm = \text{Ind. T.F.}$$

When d = diameter of cylinders, in.,
L = piston stroke, in.,
D = diameter of drivers, in.,
Pm = mean effective pressure, lb. per sq. in.

Pm is the boiler steam pressure, P, multiplied by a fraction, expressing the mean pressure as some percentage of P. For any locomotive, the value Pm varies according to the speed m.p.h., while the expression in brackets is the engine constant depending only on the dimensions of the cylinders and the driving wheels, the value obtained being the tractive force available in pounds for any given mean effective pressure acting on the pistons.

For any locomotive of given dimensions, the tractive force in the cylinders is therefore a function of Pm and for any Pm will depend upon the cylinder and driving wheel dimensions. For present purposes, tractive force as developed in the cylinders only is considered, for the reason that this discussion is mainly concerned with the mean effective pressures realised in the cylinder at varying rates of admission and rotational speeds.

Based on the appropriate data given in Test Report Bulletin No. 5 for the British Railways class "7" engine No. 70005, Table No. 1 gives the mean effective pressures indicated at speeds of 91-320 r.p.m. and for running cut-offs of 15, 20, 25, and 30 per cent. The information given includes the speed in m.p.h., r.p.m., the indicated tractive

TABLE 1.—BRITISH RAILWAYS CLASS "7" LOCOMOTIVE
Working Pressure 250 lb. per sq. in.

Speed		Cut off 15 per cent			Cut off 20 per cent			Cut off 25 per cent			Cut off 30 per cent		
m.p.m.	r.p.m.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.
20	91	9,600	63·5	25·4	11,800	78·1	31·2	13,900	91·8	36·6	16,200	107·5	43·0
30	136	8,400	55·7	22·2	10,550	70·0	28·0	12,600	84·7	33·9	14,750	97·5	39·0
40	182	7,700	51·1	20·4	9,650	64·0	25·6	11,700	77·1	30·7	13,600	90·0	36·0
50	227	7,150	47·3	18·9	9,000	59·5	23·7	10,800	72·0	28·7	12,500	83·0	33·2
60	273	6,700	44·3	17·8	8,400	55·5	22·2	10,100	67·0	26·8	11,650	77·1	30·8
70	319	6,250	41·5	16·6	7,700	51·0	20·4	9,400	62·2	24·8	10,850	72·1	28·8

TABLE 2.—L.M.R. CLASS "4" LOCOMOTIVE
Working pressure 225 lb. per sq. in.

Speed		Cut off 15 per cent			Cut off 20 per cent			Cut off 25 per cent			Cut off 30 per cent		
m.p.h.	r.p.m.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.	Ind. Tractive Force, lb.	M.E.P. lb. per sq. in.	M.E.P. per cent of Boiler Press.
20	107	8,100	64	28·5	9,900	78·0	34·6	11,900	94·0	41·8	14,000	111·0	49·4
30	160	7,000	55·5	24·6	9,000	71·0	31·5	10,850	86·0	48·6	12,750	100·1	44·7
40	213	6,400	50·5	22·5	8,100	64·0	28·3	9,800	77·6	34·4	18,100	95·5	42·5
50	266	5,900	46·0	20·5	7,400	57·5	25·5	8,700	69·0	30·6	Corresponds to 35 m.p.h.		
60	320	5,200	41·1	18·3	6,500	51·7	22·8	7,750	61·0	26·9			

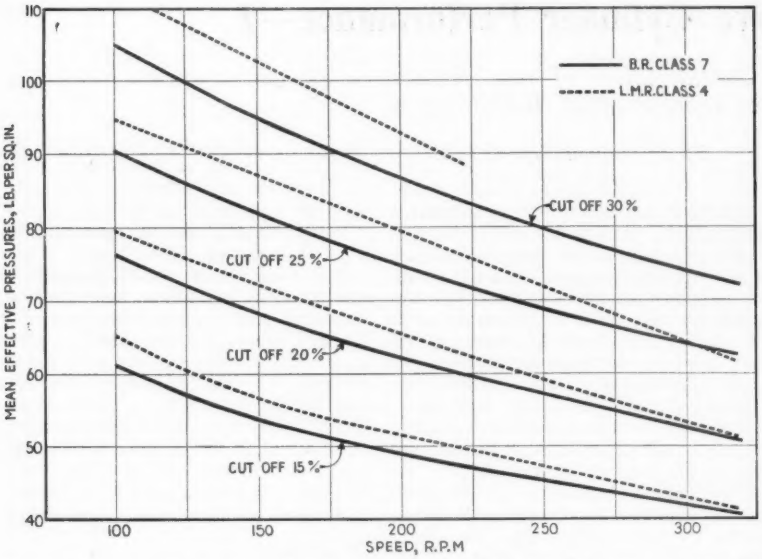


Fig. 1—Comparative mean effective pressures of British Railways class "7" and L.M.R. class "4" locomotives

force, the mean pressures and the mean pressures expressed as a percentage of the boiler working pressure.

Table No. 2, on the previous page, provides identical information based on Test Report Bulletin No. 3, for 2-6-0 L.M.R. class "4" engine No. 43094. A further tabulation, No. 3 gives certain particulars of these engines relating to the cylinders and valves, necessary when considering the performance of these two locomotives.

The mean effective pressures obtained in the cylinders of the class "7" and class "4" engines are presented by the plot, Fig. 1, for cut-offs of 15, 20, 25, and 30 per cent and rotational speeds of 100-320 r.p.m. The full lines relate to the class "7" engine and the broken lines to the class "4" engine. The computed data from which these curves have been constructed are based on the indicated tractive effort curves as shown in the test report bulletins, which are plotted for each cut-off against speeds in m.p.h. The numerical values given in the tables are taken as being the mean effective pressures obtaining in the cylinders for the different cut-offs and at the given speeds. In other words, it is assumed that the cut-offs are maintained independent of the speeds in m.p.h. or the corresponding speeds in r.p.m.

Referring to the graphs, Figs. 1 and 2, the noticeable feature relating to all the curves of mean pressures is the rapid fall in the pressures acting on the pistons at all rates of cut-off with advancing speeds. As a case in point, when running at, say, 273 r.p.m., or 60 m.p.h., and at 15 per cent cut-off, the class "7" engine maintains a mean effective pressure of 44 lb. per sq. in., equal to about 17·6 per cent of the boiler working pressure.

The broken line curves relating to the class "4" engine are interesting as indicating higher mean pressures at given cut-offs and rotational speeds, though the boiler working pressure is 225 compared with 250 lb. per sq. in. in the case of the class "7" locomotive.

The class "4" engine maintains higher mean effective pressures in relation to the nominal working steam pressure, the actual proportions expressed as a percentage of the boiler working pressure being given by Table No. 2. Assuming the boiler pressure is raised from 225 to 250 lb. per sq. in., the mean pressures realised in the cylinders of the class "4" engine would be as shown by Fig. 2, which indicates the performance of the class "4" locomotive at cut-offs of 15, 20, 25, and 30 per cent, and at speeds of 20-60 m.p.h., corresponding to rotational speeds of 107-320 r.p.m.

At 51 m.p.h., or 273 r.p.m., and at 15 per cent cut-off, this engine develops mean pressures of 46 and 51 lb. per sq. in. for working pressures of 225 and 250 lb. per sq. in., which may be compared with the mean pressure obtained with the class "7" engine in the same running conditions. In making this comparison of the mean pressures at these two boiler working pressures, it is assumed that the mean pressures are the same percentage of the boiler pressures in each case and that the specific volumes and densities are the same for both the higher and lower working pressures.

(To be continued)

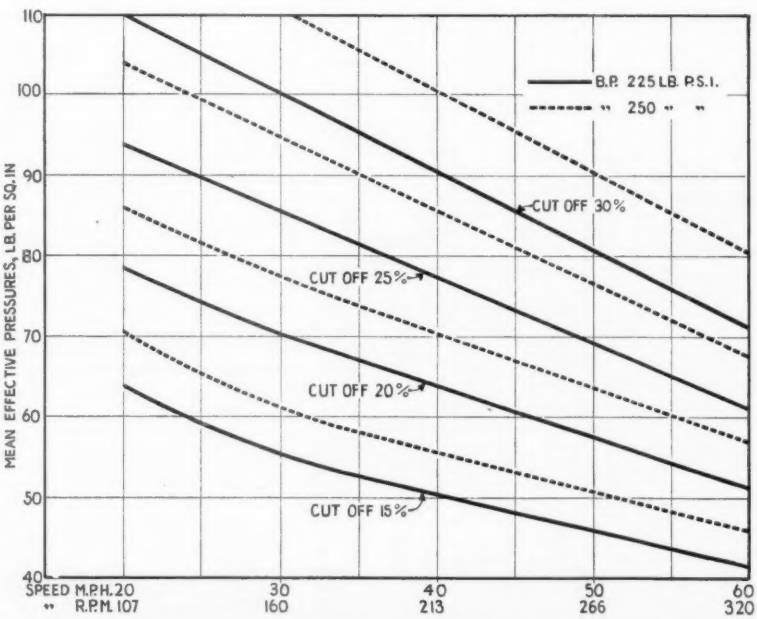


Fig. 2—Mean effective pressures lb./sq. in. and speed in m.p.h., L.M.R. class "4" locomotive

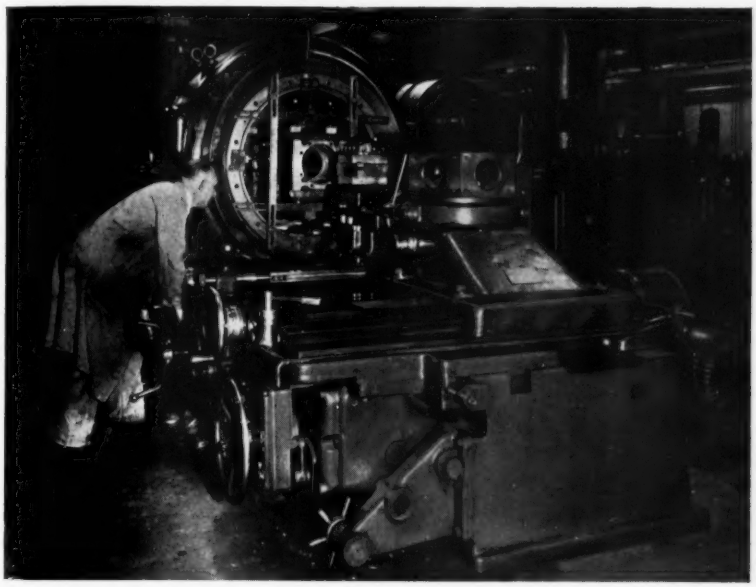
CRYSTAL PALACE HIGH LEVEL BRANCH TO CLOSE.—On and from September 20, services will be withdrawn from the Crystal Palace High Level Branch, and Honor Oak, Lordship Lane, Upper Sydenham and Crystal Palace High Level stations will be closed. London Transport bus service No. 63 will be extended from the present terminus at Honor Oak to Crystal Palace Parade, serving Lordship Lane and Upper Sydenham.

NEW CABLE FACTORY AT SOUTHAMPTON DOCKS.—The Docks & Inland Waterways Board of Management announces that Standard Telephones & Cables Limited are to erect an extensive factory on the New Docks industrial estate at Southampton Docks for the production of submarine telephone cable and submerged repeaters. Initially a site of 10 acres is required, but the complete scheme will entail an additional eight acres. The selection of a site in the Southampton Docks area is stated to have been made because of the good rail and sea transport facilities.

Production of Anti-Friction Bearings

Problems in the manufacture of cannon-type axleboxes

By D. McNicoll, B.Sc.



Boring cannon box housings in an Oldfield & Schofield double-ended lathe

ONE of the outstanding developments in locomotive design during the present century is the application of roller-bearing axleboxes. In the case of steam locomotives, more than most other prime movers, the application of anti-friction bearings is bound up with the problem of design and manufacture of the housings in such a way as to ensure perfect alignment.

Of these designs, the use of cannon-type axleboxes for engine axles, represented the biggest departure from what had hitherto been the usual practice. The cannon-type axlebox is in essence two single axleboxes connected together to form a unit assembly, and are split horizontally or designed as a one-piece casting.

Cannon Type Axleboxes

Although the manufacture of cannon-type axleboxes involves simple operations such as boring, facing, milling, drilling, and so on, the design is such that economic production in quantity on machines of what may be termed normal design were, because of repeated setting, liable to produce inaccuracies. In the early days of tapered roller-bearing equipped locomotives, when their application was more or less experimental the number of cannon-type axleboxes was relatively small. In these circumstances, manufacture on conventional machines by improvised methods was considered part of the development work associated with a new product.

Subsequently the number of applications had increased to an extent which precluded the continuance of improvised methods, and British Timken Limited established at their Birmingham works a department specially equipped for large-scale production of axleboxes of this type. Methods were based on the conception that most operations on cannon-type axleboxes could be carried out on a form of duplex machine which would enable both ends to be machined without re-setting.

The problem was complicated because cannon-type axleboxes are used in conjunction with single axleboxes of somewhat similar design. This implied that any special plant should be equally capable of machining both types of axleboxes economically. The first group of operations for which a special machine was evolved was for the boring and facing of both ends of cannon-type axleboxes.

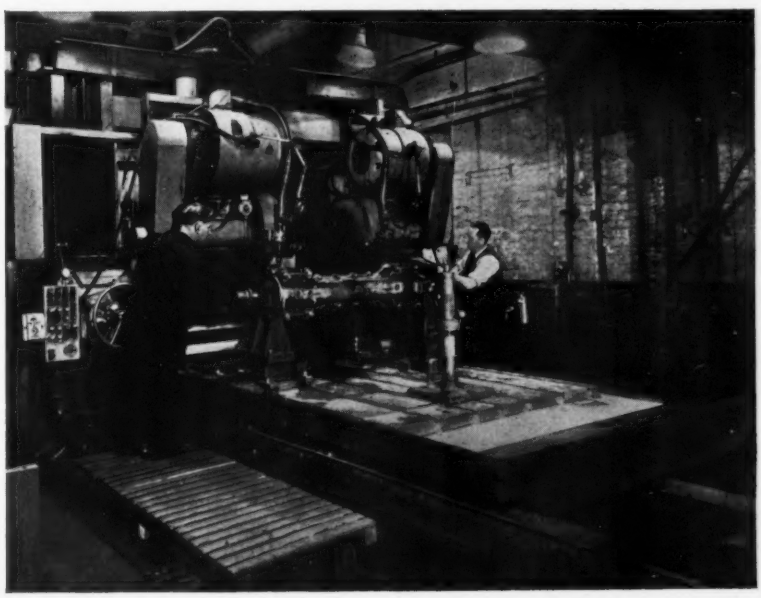
Concentricity of Bores

To obtain maximum concentricity of bores at each end of the housing it was desirable to carry out the operation on a machine in which the housing would rotate. The problem was resolved by the installation of a large double-ended, hollow spindle, boring and facing machine, the bore of the head being such that it would accommodate the largest housing.

The machine, which was manufactured by Oldfield & Schofield & Co. Ltd., Halifax, is powered by a 70-h.p. motor. Boring and facing are carried out on both ends of the cannon axlebox simultaneously. Not only is alignment assured, but a considerable reduction in machining time was in this way obtained.

Although the machine is double-ended, it has been found practical to employ a single operator, with both sets of tools working at each end of the axlebox.

The design of the machine is such that a faceplate can be fitted to each end of the hollow spindle, enabling it to be



Thompson plano grinder, grinding two horncheek guides simultaneously

XUM

Machining horncheek faces on a Cincinnati horizontal miller. The heads feed vertically

Archdale multi-spindle horizontal drilling machine drilling the joint face of a cannon box housing

used as a conventional boring and facing lathe on which single axleboxes are produced. The machine has a considerable speed range, and is capable of handling a wide range of work.

The grinding of horn guides of single axleboxes is carried out on open-sided surface grinders of conventional design, and while practicable for this purpose, difficulty was experienced in devising an entirely satisfactory set-up for cannon-type axleboxes. It was desirable to evolve a machine of sufficient power, with two grinding wheels operating simultaneously on the same side of each horn guide.

A large plano-grinder was designed and manufactured by the Thompson Grinder Company, Springfield, Ohio. The machine has two grinding heads which are designed to accommodate 24 in. dia. by 5 in. wide grinding wheels. Duplicate controls are provided on each side of the machine, and each grinding wheel with its own motor can be operated independently. Two operators are employed, working as a team. The machine table is 10 ft. long by 6 ft. wide, and is also suitable for dealing with joints faces where cannon-type axleboxes are of the split type, and also with single axleboxes.

Vertical Milling

The milling operation was initially carried out on a conventional duplex miller, so that each end of the axlebox required a new setting, a procedure which proved expensive because of the setting time involved. Considerable economy in machining time resulted by the installation of a Cincinnati duplex horizontal miller with the heads designed to feed vertically; the table is hydraulically operated. The table dogs are set so that the axlebox can be traversed by the amount of the horn guide centre distance. In this way both ends are duplex-milled without resetting. The machine is equally effective for machining single axleboxes.

The drilling of cannon-type axleboxes was not economical on conventional radial or vertical drilling machines, especially where the split-type were concerned, and a multi-spindle horizontal drilling machine was installed. The machine, which was manufactured by James Archdale & Co. Ltd., is a 12-spindle machine fitted with automatic hydraulic relieving mechanism for the head.

An adjustable jig is fitted on which half-axleboxes can be mounted vertically, or solid axleboxes mounted horizontally. Since the number of holes in an axlebox is seldom less than 16, half-axleboxes are generally drilled in two settings. Eight holes at one end of the axlebox are drilled first, the axlebox is then reversed for drilling the other holes. Design of the jig is such that half-axleboxes are located at each setting with extreme accuracy.

IMPROVED ECLIPSE 20T HACKSAW FRAME.—James Neill & Co. (Sheffield) Ltd. has developed a new design of the Eclipse 20T hacksaw frame which replaces that of tubular form. The new design of handle gives greater comfort and directs the pressure at the angle required for maximum efficiency. A tubular bow of oval section has been adopted which provides greater strength and rigidity, and a clearer view of the workpiece. The frame is supplied complete with an Eclipse high-speed steel hacksaw blade.

TWO-GANG FLAMEPROOF SWITCH.—The General Electric Co. Ltd. has developed a flameproof switch, which can be used for locomotives in mines and so on, for head and rear light changeover control, or in any situation requiring separate switches. In one case the covers of the switch and the terminal chambers and seatings have machined faces of the required width to give flameproof protection. The switch chamber has two one-way, earthed Landor, rapid make-and-break five amp. single-pole flush switches; their external operating handles and the cover of the switch chamber are completely interlocked. The switch complies with B.S. 229, and the standard finish is grey enamel.

INFRA-RED HEATING IN THE FOUNDRY.—In the Bronze Casting Division of J. Stone & Co. (Charlton) Ltd. sand moulds are surface dried with infra-red heating to produce the firm surface and freedom from air pockets necessary for casting 18 in. dia. wheels weighing about three cwt. The half moulds, in boxes each measuring 27 in. x 27 in. x 5½ in. deep, are dried satisfactorily to a depth of approximately ½ in. in 15 minutes. They are heated by radiation from sheathed wire elements in two identical and compact plants supplied by the General Electric Co. Ltd., each with its own roller track conveyor. Each plant, rated at 9 kW., has a bank of troughs with polished aluminium reflector surfaces, mounted horizontally on an angle-iron floor stand. Doors are provided at both ends, and these and the sides have inner reflecting surfaces.

Improving the Port Elizabeth-Johannesburg Main Line

A £4,500,000 scheme including nine tunnels and six major bridges to facilitate operation over a trunk route

New marshalling yard at Noupoort constructed as part of the improvements scheme; the yard is connected with the main line to Port Elizabeth

NINE tunnels are being built to improve the Cape Midlands main line of the South African Railways from Port Elizabeth to Johannesburg, one of the most important links between the coast and the interior. The line is used extensively to carry traffic to Southern Rhodesia and other northern destinations.

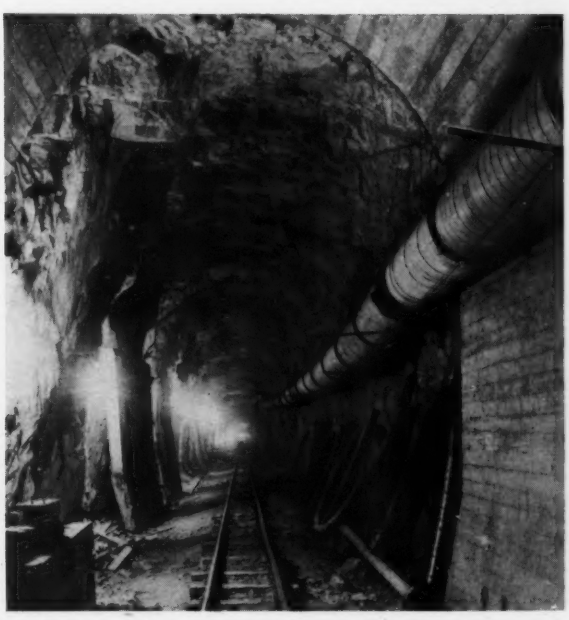
A new process for driving tunnels has been introduced with satisfactory results. The rate of progress has been speeded up and the opening of the Bushmans River-Cookhouse section is now scheduled to take place next August instead of in March, 1955, the original date based on the now discarded tunnelling process.

The old line between Bushmans River and Cookhouse is being replaced by a new section, 37 miles in length plus a small deviation of two miles. The general rate of progress of work on the Cape Midlands line has been accelerated considerably, as a result largely of the improved tunnelling technique.

The method originally in use in tunnelling was to excavate a small heading about 8 ft. by 8 ft. by 8 ft. at the roof of the proposed tunnel. This was then widened to the full shape of the arch and the stone removed to foundation level. Drilling was done by means of hand-held pneumatic drills and the broken rock was loaded into the cocopans by means of two small compressed-air-driven mine-car loaders. Working 24 hours a day and 5½ days a week, progress was at the rate of 170 ft. per month, with a best month of about 270 ft.

Modern Drilling Methods

Towards the end of 1952, this method of drilling was discarded. The hand-held drills were replaced by 11 power-feed drills mounted on a drill carriage and instead of the 8 ft. holes of 1¼ in. diameter which had been drilled previously, holes of up to 14 ft. deep and 1½ in. dia. could be made, with the resultant use of larger blasting cartridges; electric delay-action blasting supplemented the old safety fuse method. Removal of the rock was also accelerated by the introduction of larger mine-car loaders, loading cocopans of 4-cu. yd. capacity instead of the older 1-cu. yd. type. The cocopans were then hauled away by fast electric locomotives. In this way, progress increased from 170 ft. to 500 ft. a month with a best month of about 600 ft. Six tunnels have been built on this section, their total length being more than two miles. The longest of these six tunnels is 4,026 ft. in length, which is some 800 ft.



(Left) work in progress on one of the nine tunnels, and (right) interior view of a partly completed tunnel

One of the reinforced-concrete bridges in course of construction

longer than any other railway tunnel in South Africa.

Work on these tunnels was expedited by replacing the old manual method of placing wooden forms for the concrete lining by the use of quickly movable steel forms. With the use of a new type of pump for pumping in the concrete the lining was being done at the rate of some 16,000 ft. a month.

A minor deviation of two miles was opened to traffic in April, 1952, and four miles of the major section was brought into use in August, 1952.

The existing line between Cookhouse and Drennan, 32 miles, runs along the west bank of the Great Fish River. Apart from the operating difficulties over this section caused by the many sharp curves and steep gradients, services have been interrupted on numerous occasions as a result of landslides and boulders rolling on to the line from the mountain slopes. To remedy these conditions it was decided to replace the whole of the existing line, and work has already started on this project. Although earthworks on this section will not be as heavy as on the more southerly section between Cookhouse and Bushmans River, there will be three tunnels totalling 1¼ miles in length, and the new line will cross the Great Fish River six times to traverse terrain where landslides and loose boulders will not be encountered. At each of the river crossings reinforced concrete bridges of six, 60 ft. semi-circular arches with a height from rail to foundation of approximately 90 ft. will be built. Work on the 15-mile portion of this section between Cookhouse and Witmoss, involving the building of two tunnels and two bridges, is well advanced and is expected to be opened to traffic during 1956; the remainder of this section should be completed by 1957.

The re-routing, regrading and general improvement of the Cape Midlands line is one of the major works now engaging the attention of the S.A.R. Administration. When completed, the line from Port Elizabeth will be one of the best from the coast to the interior. The total cost is estimated at £4,675,850.

Original Alignment

The section of the line between Port Elizabeth and Noupoort was originally constructed with many sharp curves and steep gradients of 1 in 40 uncompensated, with the result that train loads had to be restricted and double-heading was often necessary. As traffic over this section continued to increase an improvement programme was started in the early 1930s, and the line was rebuilt to grades of 1 in 80 uncompensated, with easier curvature, to a point near Bushmans River, 82 miles from Port Elizabeth. This plan had to be abandoned on the outbreak of the 1939-45 war. As soon as possible after the war the position was reviewed and it was decided that all gradients should be reduced to 1 in 80 compensated and curves have a minimum radius of 1,320 ft. in the more mountainous areas and 1,650 ft. in the easier country. Work was restarted during the 1950-51 financial year.

COR-TEN STEEL PRODUCTION.—For the first time in this country Cor-Ten steel has been rolled on the hot strip mill. The Steel Company of Wales Limited announces that it has rolled some of this high-tensile corrosion-resisting steel in coils and sheets at the Abbey Works, Port Talbot. Cor-Ten is the registered trade name given to this steel by the United States Steel Corporation and is produced in this country under licence. It is particularly suitable for use in the manufacture of railway wagons, mining equipment, commercial vehicle bodies, and petrol tankers.

FLUORESCENT LIGHTING FITTINGS.—As a result of research at its Tottenham laboratories, the Benjamin Electric Limited announces a new additional range of Flurolier fittings, Peropal finish. Peropal finish is achieved by a new technique of high-temperature stove-enamelling, embodying a synthetic resin providing the maximum protection and durability. The new range has been specially developed for light industrial needs and those departments of factories where the conditions are reasonably clean and dry. Basically the same as the original Flurolier fittings both in design and performance, the new Peropal range provides the same ease of maintenance and a variety of installation facilities. These include installation in continuous runs or as individual fittings. The top channel, in addition to accommodating mains wiring, also houses the auxiliary gear. Other features include reflectors with or without top light facility; exclusive lamp-holder design; and easy detachability of reflector for cleaning.

NEW METHOD OF PACKING IN FRANCE.—For some years, firms in the United States have been using a form of packing which involves completely covering articles with a protective plastic envelope. The plastic, which is applied by a gun, has a resinous base and forms a resistant, flexible, airtight cover which will last some years. This process is being developed in France, particularly for such articles as aeroplane motors and electric transformers. In the first place narrow strips of fabric are fixed horizontally and vertically between the most protruding parts in such a way as to form a network of squares with sides of approximately 50 cm. (1 ft. 7 in.). For the first application, the plastic is mixed with a product which enables it to solidify as it leaves the gun. Long strips are shot across the network to give a spider's web effect. Three layers of the "cocoon" plastic are then applied, each tinted in a different colour so that the operator can see that layers of uniform thickness are being applied. Small holes are left to enable the plastics to dry out thoroughly, and are covered up when dehydration is complete. Each layer of plastic is only about 1/20 in. thick, but the final result is a strong covering which cannot be broken by hand. To remove it, a small hole is made with a special instrument and the plastic peeled off in strips.

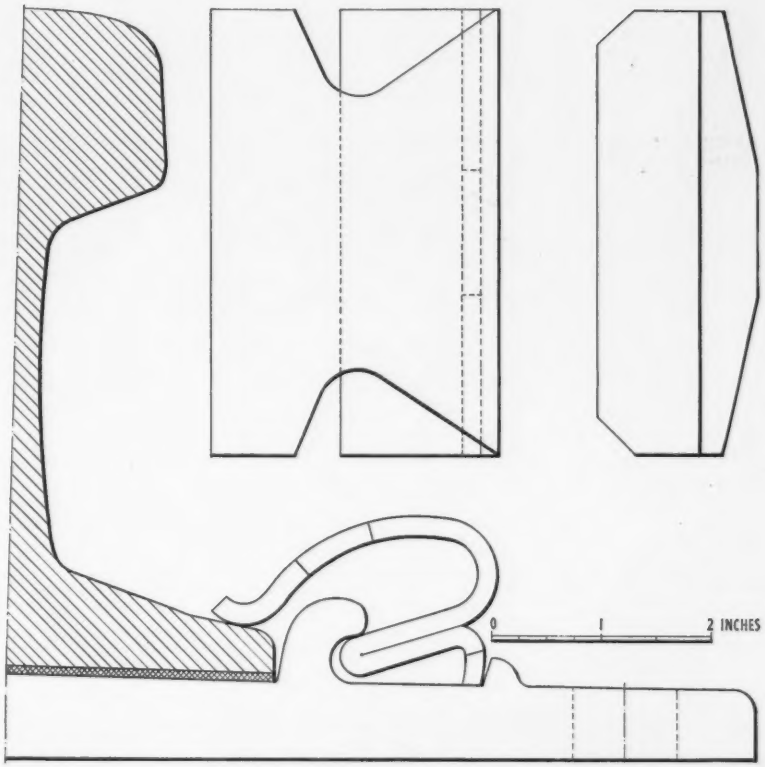
BATTERY CAP LAMPS FOR LONDON TRANSPORT LINEMEN.—Linemen working in the London Transport underground system have been equipped recently with alkaline battery cap lamps. The NC. 113C lamp, made by Nife Batteries, of Redditch, Worcs., can be used at any angle. The lamp is powered by a Nife three-cell nickel-cadmium alkaline battery carried in a satchel at the side. The headpiece can be clipped to the coat or belt, or worn on the cap. It weighs 5½ oz. and is formed of toughened plastic. There are a main high efficiency 1 amp. Krypton gas-filled bulb and a pilot 0.3 amp. bulb for conserving battery power. Special charging apparatus has been constructed by the Signal Engineer, L.T.E.

Fastening Flat-Bottom Rails

Elastic fastening for securing rails to all kinds of sleepers with few parts and an anti-creep grip

THE experience of permanent way engineers has shown that in the design of future track, and especially its fastenings, one objective should be provision of a method of securing the rails to the sleepers that will tend to reduce the cost of laying and relaying without increasing the cost of the material involved, and one showing decided technical improvements over existing practice. It must, moreover, insure a definite increase in economy in track maintenance, be adaptable to any type of sleeper in use, be easily and rapidly inspected, have as few parts as possible, and be able to be fitted by unskilled labour.

A half-mile length of track on the Metropolitan Line of London Transport has been laid with a fitting known as the Hey-Back soleplate fastening the designers of which have endeavoured to meet all these requirements. The illustrations and drawing show its various characteristics; as f.b. rails are now used in almost all countries it is designed for use with them. It is adaptable to practically any established methods of assembly and fixing, without disturbing current policy.



Detail of soleplate fastening and action of spring

Conventional Fastenings

The soleplate may be secured to the sleeper by any of the normal methods such as with screw dog-spikes or bolts in the case of timber or bolting with concrete sleepers. For use with steel sleepers, which differ so greatly in design and manufacture, alternative methods are available. In all cases it is recommended that the soleplate should be pre-fitted to the sleeper either with or without a rubber or other resilient pad as a seating. The laying of the rail on the soleplates is even more simple than in b.h. chaired and keyed track, the Hey-Back spring clips being assembled in the plate specially easily with the aid to the two leading angles. They enable the spring to be started by hand from either side, after which it is driven home with the conventional keying-hammer; the release

Hey-Back soleplate fastening on electrified track of Metropolitan Line near Neasden, London Transport

XUM

of the rail is equally simple. The soleplate may be of either rolled or cast metal and its weight is about half that of a corresponding b.h.-type chair and its cost correspondingly lower.

The constant pressure of the spring, whether the rail is under load or in free vertical motion, exerts a strong anti-creep frictional force on the rail and this resistance is shared equally by all sleepers, which will move forward in the ballast before the springs allow of any movement between rail and sleeper. Moreover, the forces retaining the spring in its keyway are three times greater than those tending to move it in the keyway, so that the sleeper will move before there is any movement of the spring in its keyway.

As the Hey-Back fastening permits of the removal of the rail without interference with the soleplate or sleeper, it provides one of the most rapid methods of rail renewal, with a correspondingly reduced interference with or interruption of traffic. The springs can be used over and over again, so that there is practically no replacement cost. In the course of routine inspection, it can be seen at a glance whether the spring is in position without projecting from the keyway, and is therefore definitely exerting a constant pressure on the toe of the rail. Should it at any time be considered desirable to check possible fatigue in any spring, it can be replaced with a few blows of the hammer.

The combination of the Hey-Back soleplates with a resilient solepad provides a completely shock-resistant flexible system of fastening without reducing the effectiveness of its anti-creep restraint, and also creates a high electrical resistance between rail and earth or rail and rail; this combination is, however, not considered essential.

Acknowledgment is made to the Chief Civil Engineer, London Transport, for assistance in supplying particulars and authority to reproduce the illustrations.

German Federal Railway Passenger Stock

Six-seater third class side corridor compartments for day travel: 72-berth couchette coaches

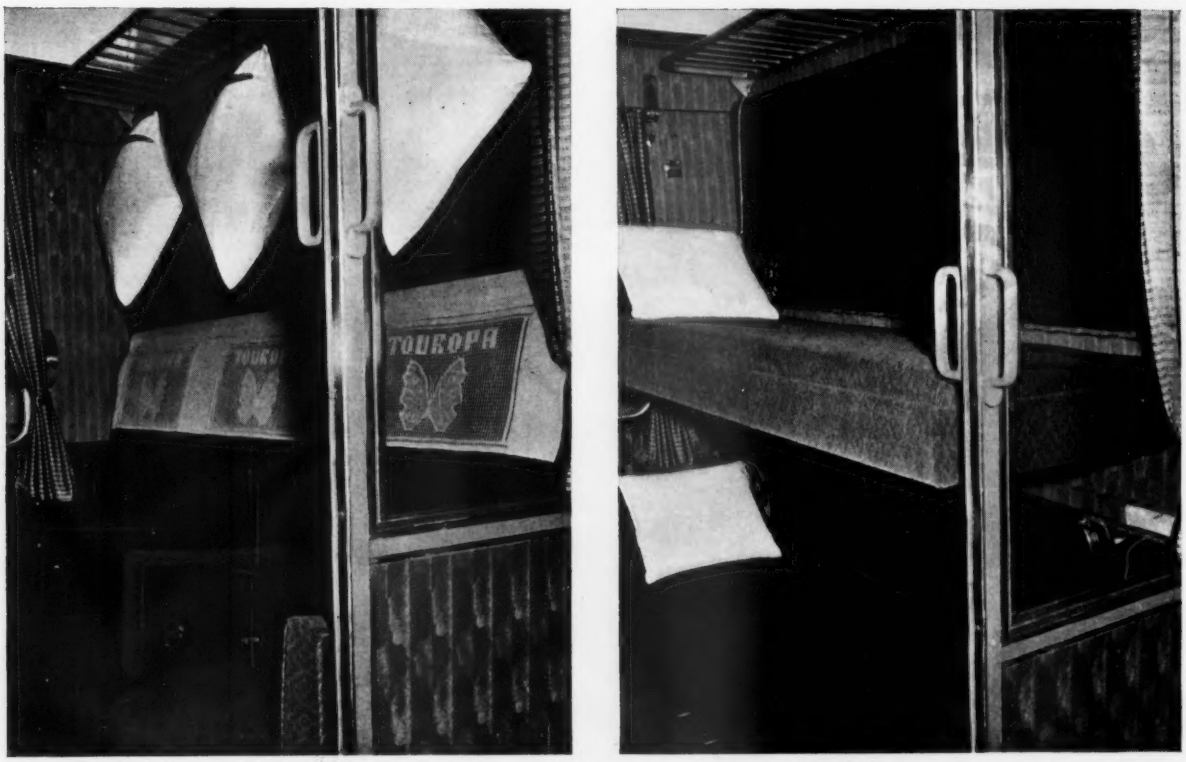
LIGHTWEIGHT second and third class compartment coaches, of 86 ft. 7½ in. overall length, placed in service by the German Federal Railway in May, have Minden-Deutz bogies with oil-operated shock absorbers. Each coach has two w.c. and two separate lavatory compartments fitted with plugs for electric shavers.

Six persons are accommodated in each third class compartment; previously this standard obtained only in second class side corridor compartments in Germany. The upholstery is of plastic, and the reclining seats have armrests. Other improvements include double-pane windows.

Third class standard *couchette* coaches have been introduced on internal long-distance services in Western Germany. Each accommodates 72 passengers in 12 six-berth compartments.

Baggage space is provided on a rack above the compartment door and side corridor. Each coach has two or three lavatory compartments in addition to two w.cs. situated at the ends.

A service compartment contains equipment for supply of hot and cold refreshments by an attendant of the German Sleeping & Dining Car Company (D.S.G.), which also supplies bedding at a moderate charge.

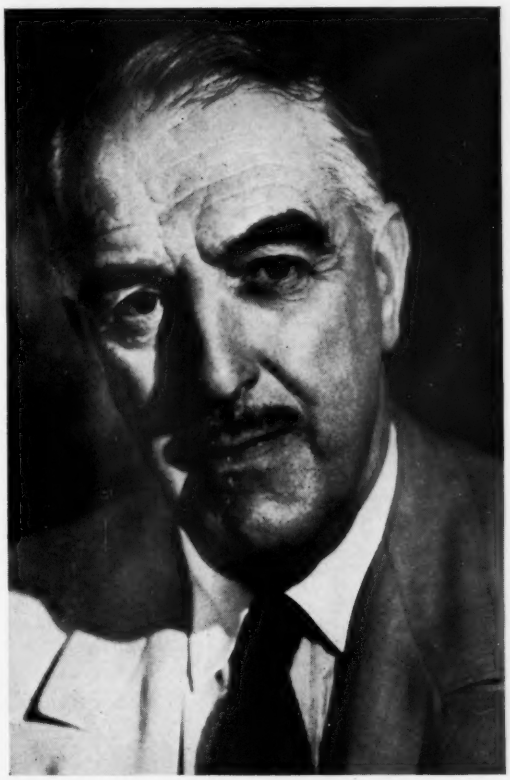


Couchette compartment arranged for day (left) and night travel. These German Federal Railway coaches are hired out to the Touropa organisation for long-distance tourist traffic

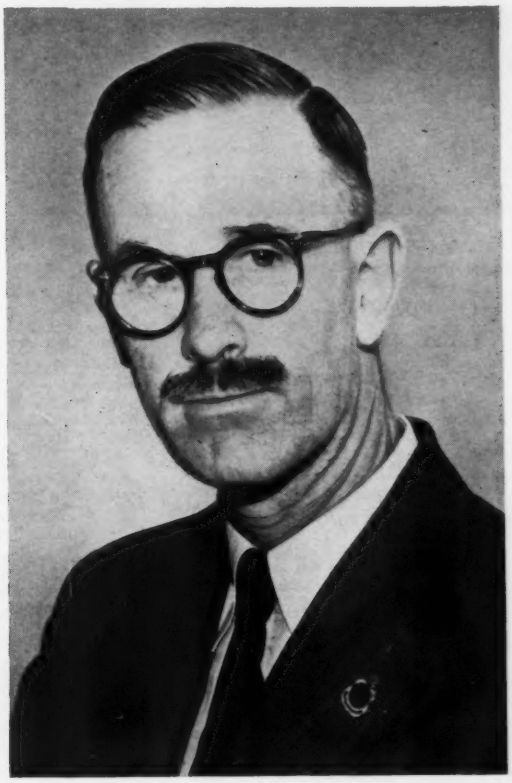
RAILWAY NEWS SECTION

PERSONAL

Colonel R. B. Emerson, General Manager of the Nigerian Railway, has arrived in England on leave. While here he will be actively concerned in the recruitment of Engineers, Permanent Way Inspectors, Inspectors of Works, Workshop Foremen, and other supervisory staff required to improve the standard of operation and maintenance of the railway, and to supervise the heavy programme of capital works now in hand. The Electricity Corporation of Nigeria has provided him with office accommodation in its London offices at 11, Manchester Square, London, W.1.



Sir Andrew Strachan
Appointed Chairman,
Rhodesia Railways Board



Mr. R. J. Bridgland
Appointed Chief Engineer,
South Australian Railways

Sir Andrew Strachan, who has been appointed Chairman of the Rhodesia Railways Board, was born in Northern Ireland in 1895, and educated at Rathmines College. He served throughout the 1914-18 war with the Royal Dublin Fusiliers, with active service in Gallipoli and France in the rank of Captain. He joined the British South Africa Company's administration in 1921 and was appointed Commissioner of Taxes in 1933 and Secretary to the Treasury in 1941. Sir Andrew Strachan was created a Commander of the Order of the British Empire in the 1947 New Year Honours List and was knighted (Knight Bachelor) in the Coronation Honours. He played a leading part in the preparations for and many conferences on the formation of the new Federation of Rhodesia and Nyasaland.

Mr. T. H. Grey, a former General Secretary of the Rhodesia Railway Workers' Union, who, as recorded in our July 2 issue, has been acting as Chairman of the Rhodesia Railways Board, was born at Berwick-on-Tweed in 1896. He went to Rhodesia in 1920 and served with the Rhodesia Railways until 1938 in the various grades from fireman to Class 1 driver. When he was pensioned (owing to disabilities arising from being gassed during the 1914-18 war) he was appointed Assistant General Secretary of the Rhodesia Railway Workers' Union. In October, 1944, he was unanimously elected General Secretary of the R.R.W.U. In 1950 he became a member of the Railway Board, and, in May this year, was appointed Acting Chairman in place of Sir Arthur Griffin, who retired on May 18. Mr. Grey has always taken a keen interest in ex-Service matters in Southern Rhodesia and at one time was National President of the British Empire Service League (Rhodesia).

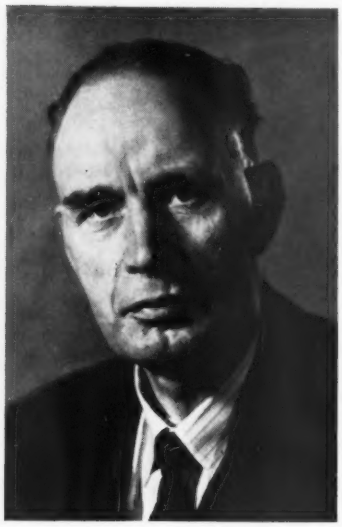
Mr. R. J. Bridgland, Designing Engineer, South Australian Government Railways, who, as recorded in our July 16 issue, has been appointed Chief Engineer of that system, has had a distinguished career as an engineer. Joining the South Australian Railways in 1936, he became Resident Engineer (Bridge Construction) on May 2, 1938. On the outbreak of the 1939-45 war Mr. Bridgland joined the A.I.F. and left Australia with the rank of major, and, after a period of five and a half years in H.M. forces, some of which was spent as a prisoner of war in the hands of the Japanese, he resumed duty on the S.A.R. in December, 1945. Promotion to the position of Designing Engineer in November, 1947, was followed by his appointment as Inspecting Engineer in March, 1953, and Assistant Chief Engineer on June 10 of the same year. His new appointment is effective from April 23, 1954.

Mr. G. S. J. Reid, Inspecting & Test Engineer for the New Zealand Railways Department, who left New Zealand in September, 1953, to establish an inspecting and advisory service in the New Zealand High Commissioner's Office in London, returned to New Zealand in April, visiting a number of countries in Europe and the United States on his homeward journey. Mr. Reid has been succeeded in London by Mr. R. F. Marriott, whose official title is that of Advisory Engineer.

In our July 9 issue we published an illustrated biography of Mr. K. R. M. Cameron on his appointment as District Motive Power Superintendent, Edinburgh, Scottish Region, British Railways, in

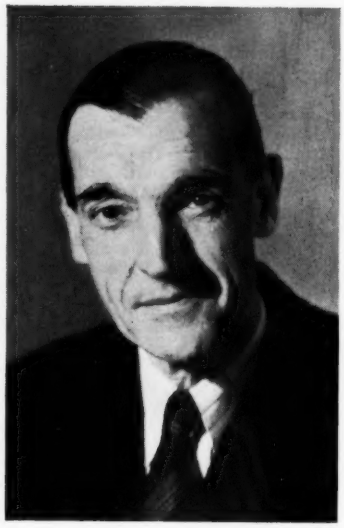
Mr. H. E. R. Bastin

Appointed District Commercial Superintendent, Cardiff, Western Region



Mr. L. A. M. Ginger

Appointed Assistant Chief Electrical Engineer, London Transport Executive



Mr. H. Branton

Appointed Assistant Electrical Engineer (Generation) London Transport Executive

which we stated that Mr. Cameron commands No. 80 Railway Workshop Regiment, R.E.S.R. This information is out-of-date, and Mr. Cameron now commands 128 Engineer Workshop Regiment. In addition, as recorded in the Supplement dated Friday, June 4, 1954, to *The London Gazette* of Tuesday, June 1, 1954, Mr. Cameron has recently been awarded Army Emergency Reserve Decoration with 1st and 2nd clasps.

Mr. H. E. R. Bastin, M.Inst.T., Terminals Assistant to Commercial Superintendent, Eastern Region, Liverpool Street, British Railways, who, as recorded in our July 16 issue, has been appointed District Commercial Superintendent at Cardiff, Western Region, joined the service of the Great Western Railway in 1917 in the Office of the Chief Goods Manager at Paddington. In 1930 he was appointed Personal Clerk to the Assistant Chief Goods Manager & Development Agent and worked in that capacity until 1932, when he took over an appointment in the Station Working Section of the Department becoming, in 1938, an Outdoor Investigator. Early in 1939 Mr. Bastin took charge of the Emergency Section set up to prepare various emergency schemes preparatory to the outbreak of the 1939-45 war. In 1940 he returned to the Station Working Section as Clerk-in-Charge and was responsible for all Terminal matters, representing the G.W.R. on Ministry of Food and Ministry of Supply Liaison committees and the Armoured Vehicles Loading Committee. Five years later, in 1945, he was appointed Secretary of the G.W.R. Mechanical Appliances Committee but later that year was promoted to be Assistant Goods Agent at Bristol. Mr. Bastin became Assistant Goods Superintendent at Paddington in 1946 and, in December, 1947, was promoted to Goods Agent at South Lambeth. He relinquished this post in May, 1950, to take up the appointment of Terminals Assistant to the Commercial Superintendent of the Eastern Region at Liverpool Street, being a member of the Eastern Region Sectional Council No. 4, and representing that Region on the Goods & Parcels Terminals Sub-Committee, principally engaged in modernisation and mechanisation of goods depots, the position he now vacates.

Mr. L. A. M. Ginger, A.M.I.E.E., Assistant Electrical Engineer (Outdoor), London Transport Executive, who, as recorded in our July 23 issue, has been appointed Assistant Chief Electrical Engineer of that organisation, was, before joining the L.T.E., Assistant for Substations & Cables in the office of the Electrical Engineer (New Works & Development), Railway Executive. In this capacity he was largely responsible for the design and layout of the substations and distribution systems for the Liverpool Street to Shenfield and the Manchester, Sheffield and Wath electrification schemes. In 1950 Mr. Ginger was appointed Assistant Electrical Engineer (Outdoor), with responsibility for the co-ordination of the operation and maintenance of the generating stations, substations, H.T. mains and distribution sections of the L.T.E.'s electric power supply system.

We regret to record the death, at the age of 83, of Mr. Clement Frederick Davies, B.A., an Assistant to the Electrical Engineer on the former London Midland & Scottish Railway until his retirement in 1935.

Dr. E. R. Gauld, M.B., M.R.C.P., D.T.M., who, as recorded in our July 16 issue, has been appointed Divisional Medical Officer, London Bridge, Southern Region, British Railways, with effect from July 1, 1954, was born in 1905 and educated at Aberdeen University. He qualified M.B., Ch.B., in 1928, and, in 1929, he was appointed House Surgeon, Mansfield Hospital. In 1931, he obtained the Diploma of Tropical Medicine, and Hygiene, and, in the same year, he joined the Colonial Medical Services, proceeding to the Gold Coast in 1932. He joined the Royal West African Forces in 1940 and served in the East African Campaign during 1940-41. After his demobilisation in 1942, and until 1944, Dr. Gauld was engaged on the railway construction work in progress on the Gold Coast. He qualified M.R.C.P., Edinburgh, in 1949, and was appointed Medical Specialist, Gold Coast, in the same year. He retired from the Colonial Medical Service in 1953.

Mr. H. Branton, Generating Station Superintendent (Lots Road), London Transport Executive, who, as recorded in our July 23 issue, has been appointed Assistant Electrical Engineer (Generation), with responsibility for the work in connection with all three of the L.T.E.'s generating stations (Lots Road, Neasden and Greenwich), joined the Metropolitan Railway in 1930 as Assistant Resident Engineer at Neasden. He became Resident Engineer three years later, and Assistant Electrical Engineer in charge of the generating station in 1940—a position redesignated Generating Station Superintendent in 1950. In 1951 Mr. Branton was appointed Generating Station Superintendent at Lots Road.

Mr. J. R. Greenwood has been co-opted to the board of Associated Commercial Vehicles Limited. Mr. Greenwood joined the board of Crossley Motors Limited (a subsidiary of Associated Commercial Vehicles Limited) in May of this year and is also Deputy Chairman of that company.

National Road Transport Federation

Mr. James Barrie has been elected Chairman of the National Road Transport Federation for the coming year. Mr. Barrie, who is also National Chairman of the Road Haulage Association, is Managing Director of John Barrie (Contractor) Limited, of Glasgow. He is Vice-Chairman of the Scottish Section of the Institute of Transport.

Mr. S. C. Bond, M.Inst.T., and Mr. F. Broomfield have been elected Vice-Chairmen of the Federation. Mr. Bond is the President of the Traders Road Transport Association and Transport & Shipping Manager of Stanton Ironworks Co. Ltd. Mr. Broomfield is Chairman of the National Council of the Passenger Vehicle Operators Association and Secretary of Barton Transport Limited.

Captain the Rt. Hon. Lord Teynham, D.S.O., D.S.C., R.N. (Retired) was re-elected President and Mr. James Paterson, M.C., M.Inst.T., and Major R. A. B. Smith, M.C., M.Inst.T., were re-elected Vice-Presidents.

British Electric Traction Co. Ltd.

Opposition to nationalisation justified

The fifty-eighth annual general meeting of the British Electric Traction Co. Ltd. was held on July 22 in London.

Mr. H. C. Drayton, Chairman of the Company, in the course of his speech, said:

During the year, we have further extended our interests in the Continental coach touring business. Touring of the Continent by coach is becoming increasingly popular and we believe that it is a business which can be built up into a sound and remunerative one and made a useful adjunct to our passenger road transport operations in this country.

I have already mentioned the amount of fuel tax we pay, which, incidentally, has risen since the end of the war from 9d. to 2s. 6d. a gallon. This increased taxation, with increased wages, has necessitated our industry going for increased fares. Rises in costs still continue and since I spoke to you last year our omnibus companies' employees have had another wage increase. This has led to still further applications for increases in fares. Nobody likes higher fares, operators least of all, and if only we could get some stabilisation of operating costs and the removal, if only in part, of the fuel tax burden which falls so heavily and unfairly on the lower paid members of the community, we might be able to hold fares at their present level for a considerable time. In case it should be thought that bus fares have gone up enormously since the war, I think it only right that the public should know that the provincial omnibus industry is probably the only one whose charges by and large are still only about 30 per cent above pre-war levels.

Denationalisation

As you are aware, this company did not believe that nationalisation of road passenger transport was in the interests of the public. The Socialist Government, as you know, brought forward legislation empowering the then Minister of Transport, if in his opinion it was in the interests of the public to set up a transport board in any area, to do so after certain steps had been taken, including a public inquiry. The first area selected was the Northern Area, in which one of our associated companies—Northern General Transport—was involved. It embraced not only our company but many other companies in the area and certain Municipal undertakings and it was received so unfavourably that the Minister did not proceed with the scheme. I might mention that some of the fiercest opposition to the proposals came from the local authorities, many of whom, including Newcastle, were Socialist-controlled.

I am telling you this because there was a feeling at the time among certain of the shareholders that we should follow the example of other transport undertakings and sell out to the then Government. You in your wisdom, under the guidance of your board, backed us and voted against this proposal. I do not think that either the public have been prejudiced or you yourselves have lost anything by doing what you were convinced was right, as against what at the time appeared to be expedient. We now have a Government in power whose avowed intention has been to return to private enterprise as many activities as possible. Under the present Transport Act, the Minister of Transport has the power to direct the British Transport Commission to divest itself of its controlling interests in road passenger transport undertakings. So far, nothing has been done, but we are hopeful that the present Government will implement this policy without delay and not let that policy remain merely a matter of words.

Overseas Ventures

Last year, I mentioned to you that we had taken an interest in road transport in Jamaica. As is the case when starting any new project, we had certain teething troubles there; but I am pleased to pay a tribute to the Jamaican Government, who fully lived up to their declaration that they wished to encourage capital in the Island, by giving us full co-operation and support in every possible way. The company is now, I am glad to say, doing well and I think that it will contribute reasonably to our profits.

Road Passengers

Since I last met you, we have taken an interest of about 40 per cent in a group of road passenger transport companies operating in Central and East Africa. I have seen the undertakings; in fact I have known them for a number of years, and we believe that there is room for expansion and that we can make them even more profitable than they are today.

It is interesting that, in these two propositions, our partner is Mr. John Watts. He and I met a good many years ago in Wales, where we were in acute competition, and I must pay him a tribute by saying that he was a bonnie fighter and a bonnie competitor, and we have found that he is just as bonnie a partner.

Promotion of Practical Men

Now it is interesting to look back to those early days. In 1927 I went down to Wales and bought seven omnibuses, which were the foundation of the present Western Welsh Omnibus Company, who, if my memory serves me right, now own 650 buses. In the building up of that company, we acquired certain other companies. One of the first we acquired was Lewis & James Limited. Then we acquired a business known as Barrett's and many others. Western Welsh today is a prosperous undertaking, but in case anyone should think that buses have always been easy to run, I may tell you that in those early pioneering days we operated with vehicles which were far from being as efficient as those we own today and on roads which were not of the standard we now know. The result was a much shorter life for the vehicles. We also had to educate the public to use the buses, and I remember that once we were really up against it; we had to raise some money and the only way in which we could do it was by means of 10 per cent debentures. I may add that those debentures did not remain outstanding one day longer than necessary.

What I really want to say to you in this connection is that we acquired much more than profitable undertakings. Mr. Barrett, the son of the founder of Barretts, is now our area manager at Pontypool. Another business we took over was White's Motors (Barry) and Mr. White, son of the founder of that business, is now general manager of our Devon General Omnibus Company. Mr. Gray, the son of the first Western Welsh general manager, is now general manager of our Yorkshire Woollen District Company. Last, but not least, in the case of Lewis and James, Ltd., a Mr. W. T. James was manager and secretary, and today I am pleased to be able to say that "Bill" James is a director of this company. Although my remarks have been confined to the early days in South Wales, what happened there is by no means exceptional; indeed, it is typical of all our companies.

Mumbles Railway

Last month I was one of those who were fortunate enough to be present at the 150th birthday celebrations of the Mumbles Railway. This Railway is the oldest passenger carrying railway in the world and its history is unique and absorbing. It is a subsidiary of one of our bus companies and has been operated by the B.E.T. Group for over half a century. During its lifetime the line has used no fewer than seven forms of motive power and, unlike its larger brethren in this country, it still makes a profit. I would like to thank all who helped to make this celebration a success, particularly the Swansea Corporation who co-operated wholeheartedly and I hope that the people of Swansea enjoyed themselves as much as I did.

The report and accounts were unanimously adopted.

PROPOSED COACH-AIR SERVICE TO CONTINENT.—The Lancashire Aircraft Corporation has asked the Air Transport Advisory Council to consider a proposed coach-air network between Britain and the Continent. The air service is planned to operate between Lympne, Paris, and Brussels. The flights to Paris are to land at Beauvais, and those to Brussels at Ghent. Buses will then take passengers from the airfield to the capitals. Passengers would buy a through air-coach ticket at a bus or coach agency in their own town for the whole journey to the Continent. It is expected that the total cost of the combined coach-air services would be slightly higher than the third class rail and sea fares for the same journeys.

OPEN DAYS ON SOUTHERN REGION.—On Wednesday, July 28, the Carriage & Wagon Works at Lancing, Southern Region, British Railways, were open to the public from 2 p.m. to 4.45 p.m. Rolling stock in various stages of construction and overhaul was on view, with examples of the latest cafeteria cars. Next Wednesday, August 4, another Open Day will be held at the Locomotive & Carriage & Wagon Works at Eastleigh, during which, from 1.30 p.m. to 4.30 p.m., the public will be able to see the new type of cafeteria cars in process of conversion. Other interesting exhibits on show will be a number of British Railways standard locomotives, including the "Britannia" class, engines of the "Merchant Navy" and "West Country" classes, and a main-line diesel-electric locomotive. Arrangements have also been made for an Adams-built locomotive of the former L.S.W.R. and the Stroudley Terrier *Boxhill* in their original liveries to be on view. Combined rail and admission tickets for this Open Day are available from Waterloo at a cost of 11s. Tickets may also be obtained from numerous provincial and coastal resorts at excursion fares. Proceeds from both Open Days will be devoted to the Southern Railway Servants' Orphanage & Homes for Old People at Woking.

XUM

Ministry of Transport Accident Report

Guildford, September 18, 1953: British Railways, Southern Region

Brigadier C. A. Langley, Inspecting Officer of Railways, Ministry of Transport & Civil Aviation, inquired into the accident which occurred at 4 p.m. on September 18, 1953, at Guildford, when the 3.12 p.m. electric train from Waterloo via Cobham, consisting of two units of four close-coupled coaches, each of the latest non-corridor suburban all-steel construction with welded bodies, running under clear signals, entered No. 1 bay platform at about 25 m.p.h. failed to stop, and ran into the sand drag. The first coach became dislodged from its bogies and shot forward over the platform, demolished a wall and passed through the station-master's office, his clerk's office and an enquiry lobby, coming to rest against another wall. The front of the second coach was lifted off its leading bogie and driven against the coach ahead but the rest of the train remained on the rails. Two passengers and five railway staff were injured, including the stationmaster and relief assistant stationmaster, the last-named fatally. Assistance was quickly summoned and the staff, in the absence of their supervisors, acted with commendable initiative. The first ambulance left for the hospital within 25 minutes. The bay line had to be closed for 56 hr. and Cobham line trains generally were terminated at London Road. It was fine, with dry rails.

There is a 30 m.p.h. speed restriction on the 12 ch. curve between London Road station and an overbridge situated 482 yd. from the commencement of the sand drag and a 15 m.p.h. one for trains into No. 1 bay.

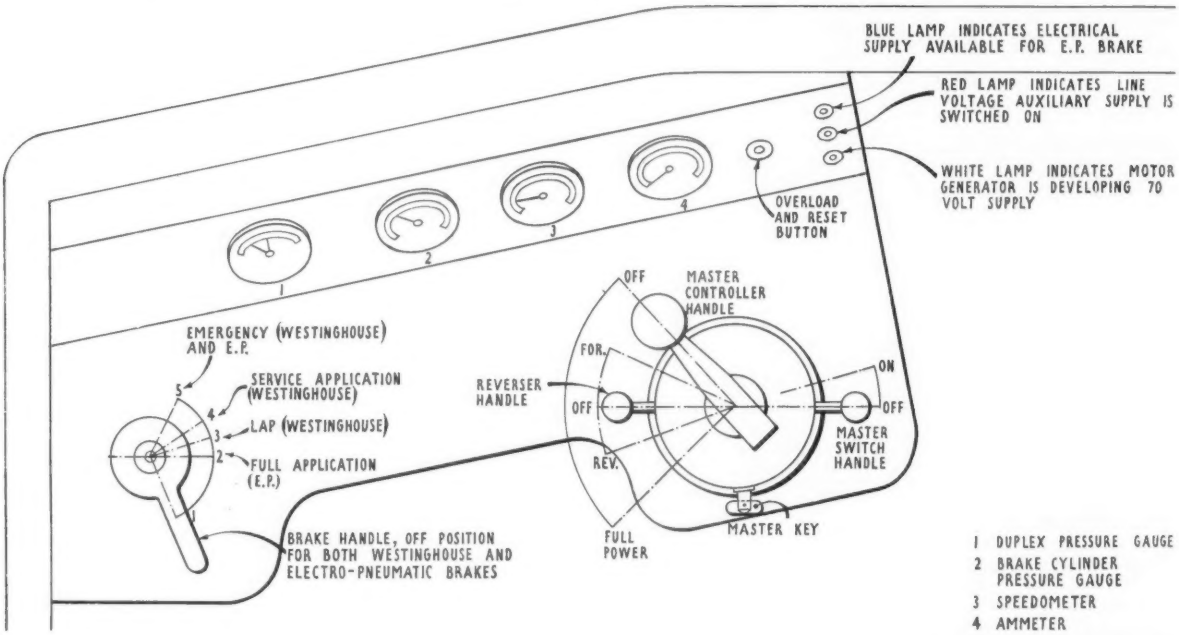
This type of stock was introduced in 1951 and has the self-lapping electro-pneumatic—e.p.—brake working in conjunction with the normal Westinghouse automatic system, the safety features of which remain in operation, whether or not the e.p. brake is in use. Total brake power was 76·5 per cent of the train weight of 270 tons. The brake is operated by a combined e.p. and Westinghouse controller in the cab and a special e.p. unit, which incorporates the triple valve, on each coach. Energy for the e.p. brake normally is taken from a 70-V. battery in the leading motor coach, kept fully charged by the motor generator and hence the electrical action will function, even with the high tension supply temporarily cut off. With e.p. working air is admitted direct from the main reservoir pipe, ensuring an even and instantaneous action throughout the train, somewhat quicker than that given by the Westinghouse itself.

The motorman drives with the brake handle on his left and power controller on his right, with instrument panel in front, as seen in the accompanying diagram. There are five notched positions for the brake handle, in two sectors. The e.p. brake is applied by moving the handle through the first sector and cylinder pressure can be varied from very slight to 50 lb. per sq. in. Any such application is retained with the handle in the second sector positions, where brake action is the same as the standard Westinghouse. The power controller is unlocked by inserting the master key and turning it through 90 deg. and the e.p. and Westinghouse brakes, together with the air compressor and control circuits can then be made ready for use by moving the master switch handle from "off" to "on." The master controller main handle has then to be depressed in the normal way to close the "deadman's" valve and is operated by pulling in an anti-clockwise direction. The reverser handle is on the left and can only be moved with the main one at "off"; whether the "deadman's" valve is closed or open does not affect that.

Course of Events and Evidence

The motorman took the train from Waterloo as his first trip that day and the prescribed brake tests were duly carried out by him and the guard. They ran non-stop to Wimbledon, then Surbiton and all stations thence to Guildford. The motorman had no difficulty in controlling the train with the e.p. brake on all occasions to London Road. It responded to it rapidly and speeds up to 60 m.p.h. were obtained. On leaving London Road, the motorman said, he passed slowly round the curve nearly stopping at the home signals when the one for the bay was cleared. He applied full power and kept it on until the overbridge, when he coasted forward with final brake application half-way down the platform. The gauge registered 50 lb. but the brake seemed not to respond. He tried to reverse, grasping the handle with the left hand and pulling, but it was locked. He did not try to make an emergency application, fearing to push the lever into the lap position and so "lose the brake." Neither did he release the controller main handle and allow the "deadman's" device to operate. He thought that it would prevent him from reversing.

He demonstrated his actions on a model and added that in an emergency there was a natural tendency to pull with the right hand as well as the left. He did not



Arrangement of motorman's brake and power handles, and other controls involved in buffer stop collision at Guildford, British Railways, Southern Region, September 18, 1953

realise that a slight movement of the controller would lock the reverser. Finally, he admitted he must have braked too late and in the stress of the moment tried to reverse, thinking that the more effective way of stopping.

The guard said that on joining the train, also at Waterloo, he tested the brakes, obtaining a cylinder pressure of 50 lb. and a train pipe one of 75. They ran without incident and when they accelerated at the Guildford home signals he ceased watching them through his periscope and went to the rear cab to change the headcode for the return journey. The train ran in and he felt a jerk, as if they had hit the buffers rather hard. He noticed no retardation entering the platform but agreed he was not paying particular attention to that.

A bricklayer in the next compartment to the motorman noticed no brake application and a porter thought the train entered the platform at usual speed, but later seemed to be accelerating, not slowing down. This was confirmed by another witness.

Examinations and Tests

A carriage and wagon examiner went to the train immediately after the accident and found all brakes to be "off" although warm and no skid marks on the rails, as far as he could see, and no wheel flats. In the motorman's cab all gauges were dead with the brake valve in the first e.p. notch. An inspection shop foreman made a detailed examination of the brakes on the rear six coaches the next day. All connections were in their correct position and properly joined up. He obtained a full 50 lb. pressure with the e.p. brake and a full pressure in the cylinders with a 15 lb. or an emergency Westinghouse application. All the equipment was in good condition.

Shortly after the accident a technical assistant found that the e.p. power supply and main controller fuses had been blown in the leading cab, and there were two faulty circuits, one in the e.p. brake, the other in the master controller. All other major power fuses and compressor fuses were intact throughout, but two shoe fuses on the middle motor coach had been taken out before moving the train. A fault in the e.p. circuit was traced to a piece of cast iron lying across the brake controls themselves. These were housed in a c.i. box and its cover became broken in the accident. A distinct burn mark on a terminal indicated current to have been passing through a circuit, energised when the e.p. brake is first applied and again when the handle is moved into the full application position and kept there, at the time of the accident. This circuit would have been de-energised had the handle been moved past No. 2 position to apply the Westinghouse brake. The conclusion was that the short circuit occurred when the cover was broken. The brake must then have been applied, but might not have reached full power. The fault on the main control circuit showed the train to have been running under power when the fuse blew. There was no sign of flashover to indicate that the motors had been reversed. The reverser for the leading coach was destroyed but all others were found in the "forward" position. The condition of the overload relays could not be ascertained, but those on the remaining three motor coaches were in the "set" condition.

A number of tests were made, details of which are given in the report. The brake and power controller apparatus concerned was found to be in good order. The overload relays were tested on the 4-car units forming the rear of the train in the accident and functioned satisfactorily. Trials with an 8-car train showed the e.p. brake to operate very smoothly and efficiently without difficulty. An emergency application, made on the assumption that the e.p. brake had failed, stopped the train from 22 m.p.h. in 69 ft. and from 25 m.p.h. in 110. Other tests were carried out on 4-car trains actually in service. At speeds of 35 to 38 m.p.h. at the overbridge above mentioned a partial e.p. application with power shut off brought speed down to 19 m.p.h. by the time the end of the platform at Guildford, 290 yd. ahead, was reached. That was with 25 lb. cylinder pressure and with only 12 lb. the speed came down to 26 m.p.h.

Training of Motormen

Classes for training motormen in the use of the new equipment were opened in 1951 and this particular man, who had had many years' experience with the standard Westinghouse brake, received two days' instruction from an inspector in February, 1952, and was given revised working instructions and had the details of the equipment fully explained to him. The working of the e.p. brake was demonstrated and with other men he went on trial runs, taking charge himself at about five stations. Emergency action was explained though no emergency stop was made. The inspector warned the men that they would not get any brake if they overshot the No. 2 position of the handle and went straight into the lap, but any pressure applied in the e.p. position would be maintained at lap or other Westinghouse position. Each member of the class stopped the train with the ordinary Westinghouse brake to see how easily it could be applied. The men were not questioned individually about the working but were asked if they understood it. None appeared to have any difficulty. This motorman agreed he had received the instruction pamphlets and thought he understood them.

He was not at all clear, however, about the working of the combined brake and said he feared he would "lose" the brake if he moved the handle into the lap position. He had made no emergency application, either during training or in service. He had also neglected to test the Westinghouse brake when running, in accordance with instructions, and excused himself by saying he thought it was a very severe brake. He said there was often as much as four months between his running with e.p. fitted trains, but records showed that since July, 1952, he had been on the new stock on 67 days, the longest gaps being 6½ weeks in that year and 5½ in 1953, which time included annual leaves. He agreed he had experienced no difficulty with the e.p. brake; he thought it very good.

Inspecting Officer's Conclusion

Brigadier Langley is satisfied that the electrical equipment was in good condition and both types of brake in order. The electrical faults found proved the e.p. brake to be on and full power being applied when the train struck the sand drag. This was due to mismanagement of the controls and the motorman must accept responsibility. Speed on entering the platform probably was about 25 m.p.h., greater than the permitted maximum, but even so the motorman should have been able to stop in time, had he applied the e.p. brake properly. His judgment must have been seriously at fault, first in entering too fast and then in delaying the final brake application until too late. Instead of making an emergency application he lost his head and tried to reverse. By pulling the controller handle he actually locked his reverser handle and applied forward power, counteracting the brake retardation. It is doubtful whether speed was less than 20 m.p.h. at the moment of impact.

The motorman is 50, with 35 years' railway service. In 1944 he qualified as steam driver, after two years as passed fireman, and was appointed motorman in 1946. Nevertheless, although he had received instruction in the new type of equipment, he did not seem to have understood fully the working of the combined brakes. His fear about losing the brake in the lap position was unfounded and he had an unreasonable mistrust of the Westinghouse part of the equipment, which he admitted he had not tested under service conditions. When an emergency arose, he reverted to the old-time locomotive practice and tried to reverse. With electric trains this generally does little more than trip the overload relays. The guard should have been watching the running of the train instead of changing the head code, but it is doubtful whether he would have had time to take action. He could scarcely have known that the train would not stop. Even had he realised that the speed was too fast and applied the brake, it would have had no effect with full power on.

Remarks

An experienced motorman failed to take the right action in an emergency, brought about by his serious misjudgment. He did not appear to assimilate technical matters easily and seemed to have formed some entirely erroneous impressions. His training should have been adequate and he was satisfied with it, but closer questioning by the inspector might have revealed something of his doubts. Special attention should be paid to this aspect of training to ensure motormen fully understanding the working and the action to be taken in normal conditions and emergencies.

The train entered the sand drag at about 20 m.p.h. No buffer stop, hydraulic included, could have absorbed the energy; indeed, one might have caused greater damage to stock. The sand drag is a cheap and simple way of stopping a slowly overrunning train and Brigadier Langley makes no comment about its use at Guildford except that its effect might be improved by increasing the sand at its end.

SIEMENS BROTHERS & CO. LTD.—The annual meeting of Siemens Brothers & Co. Ltd. was held in London on June 23. In his circulated statement, General Sir William D. Morgan, Chairman, said that the previous year had been a disappointing one. Net profits had fallen from £556,425 in 1952 to £488,357 in 1953, but trading profits had fallen from £1,431,346 to £754,867. Overseas competition had become acute and an appreciable proportion of export orders secured had to be taken at a small profit, or even at no profit at all. The severity of Continental competition was illustrated by the fact that orders were placed at prices much below those possible under production conditions in this country. The Siemens and General Electric Railway Signal Co. Ltd. had just completed a large contract in Canada for the supply and installation of signalling equipment for the Toronto Subway. The financial position of the company was sound and the reputation of their products second to none. A prosperous future should lie ahead of the group. The report and accounts were adopted unanimously.

XUM

International Union of Railways

Annual meetings of the Committees in Hamburg

On the invitation of the German Federal Railway, the annual meetings of the Committees of the International Union of Railways (U.I.C.) were held in Hamburg over the period June 24 - July 7. Consequent on the central position of Hamburg the meeting was a large one; the delegates numbered some 250 and included many senior officers of the Scandinavian railways, as well as those of the railways of Eastern Germany, Czechoslovakia, Hungary, Poland, and Jugoslavia.

The Information Centre of European Railways (C.I.C.E.) and the Office of Research & Experiments (O.R.E.), both U.I.C. organisations, were represented, as were others active in the sphere of European international rail transport, such as the Union of Railway Medical Services, the R.I.V., the R.I.C., the European Passenger and Freight Timetable Conferences, and the Union of Railway Road Services. Government bodies sending representatives were the Economic Commission for Europe, located at Geneva, and the Central Office for International Transport whose headquarters are at Berne.

Work of the Committees

In conformity with the long established procedure, the work is carried out in a series of standing committees, the chairmanship being held variously by the different countries; reports of sub-committees are reviewed.

The First Committee, covering passenger traffic matters, met under the chairmanship of Mr. R. H. Hacker (British Railways). Amongst important questions which it dealt with were international passenger tariffs, tapering scales of fares, and methods possible of adoption to ease peak travel periods.

The Second Committee, covering freight traffic questions, met under the chairmanship of Dr. H. Dirlewanger (Swiss Federal Railways), and subjects under review included the design of international freight tariffs, the possibilities of a uniform classification and the study of rating questions in connection with the use of containers in international traffic.

The Third Committee, with Mr. E. E. J. H. Desorgher (Belgian National Railways) as its chairman, is responsible for accounting and statistical matters; at Hamburg it discussed a wide variety of questions, amongst which may be mentioned the problems of traffic costing and the simplification of documents dealing with the accounting side of consigning freight.

The Fourth (Operating) Committee, of which Signor Cirillo (Italian State Railways) is chairman, reviewed the question of improved international passenger services, icing methods for refrigerator wagons, the uniform lettering and marking of wagons, and the possibilities of double-direction working on main lines.

The Fifth (Technical) Committee, under the chairmanship of Monsieur Parmantier (French National Railways), conducts its work, of necessity, through the medium of several sections, concerned, for example, with electrical matters, diesel traction, rolling stock, track, signals, and so on, and the decisions reached over the years have been of great advantage in assisting the through running and standardisation of rolling stock, and even of motive power.

The Sixth Committee, of comparatively recent formation, is presided over by Dr. W. Haustein (German Federal Railway), and is responsible for the study and recommendations on general questions, amongst which the financial situation of the railways occupies a leading place. Current matters under review by the committee include a study of the methods to be used in financing capital works and modernisation of rolling stock.

Special Committee for Documentation

There is also a Special Committee with the object of the furtherance of exchange of information whether in the form of documents, reports, films, or other data. This met under the chairmanship of Mr. C. E. R. Sherrington (British Railways). Amongst matters under review at Hamburg were the virtual completion of the first film produced jointly by several national railways, and the progress made with a dictionary of general railway terms in five languages.

A feature of the sessions at Hamburg was the notable trend towards joint meetings of two or more committees.

The several committees of the U.I.C. are purely working bodies, and the results of their decisions are far-reaching in terms of international railway working throughout Europe.

The German Federal Railway arranged a visit to the North Sea coast on the Sunday, and entertained the delegates to dinner at Hamburg during the meeting, whilst a reception was offered by the Mayor of Bad Segeberg.

The British delegates attending the various committees included :—

Messrs. L. H. K. Neil, T. R. Hawkes, J. W. J. Webb, W. J. A. Sykes, T. W. Brown, D. Murray, H. Ormiston, C. A. Gammon, E. G. Brentnall, H. J. Bourn, L. S. J. Keeys, S. S. Hirst, H. P. Betlem, and W. B. Addinall, with members of the staff of the Continental Traffic Committee.

London Transport was represented by Mr. H. R. Broadbent.

The success of the meeting was, in large part, due to the admirable arrangements made by Dr. Helberg, President of the Hamburg-Altona Division of the German Federal Railway.

Parliamentary Notes

Post Office (Site & Railway) Bill

The Post Office (Site & Railway) Bill was read the third time and passed by the House of Lords on July 13.

Transport Charges

The Transport Charges, &c. (Miscellaneous Provisions) Bill, which has passed all its stages in the House of Commons, was given a first reading in the House of Lords on July 15.

Questions in Parliament

Nationalised Industries

Mr. Gerald Nabarro (Kidderminster—C.) on July 13 asked in the House of Commons whether the Prime Minister would now make a statement in regard to the recommendations of the Select Committee upon Nationalised Industries, the final report of the committee having been published nearly 12 months ago.

Mr. Robson Brown (Esher—C.) asked a similar question.

Captain Harry Crookshank (Lord Privy Seal) replied: The Government have carefully considered the views expressed on this matter from both sides of the House and are satisfied that there is a substantial body of support for the establishment of a Select Committee. They are further satisfied that there is no desire in the House of Lords that this committee should be a Joint Select Committee of the two Houses. In these circumstances, the Government intend to table next Session a Motion for the appointment of a Select Committee of this House on the general basis recommended in the Select Committee's Report.

Gas Turbine Locomotives

Mr. George Darling (Sheffield Hillsborough—Lab.) on July 12 asked in the House of Commons what information had been gained from the experimental gas turbine locomotives operated on behalf of the Ministry of Fuel & Power by British Railways.

Mr. L. W. Joynson-Hicks (Parliamentary Secretary to the Ministry of Fuel & Power) replied that the only locomotive which was being developed on behalf of the Minister of Fuel & Power was still under construction and not yet ready for trials.

Mr. Darling asked if the Ministry had any information about the gas turbine locomotives that were in operation.

Mr. Joynson-Hicks said he thought Mr. Darling should direct that question to the Minister of Transport or write to the B.T.C.

Mr. P. J. Noel-Baker (South Derby—Lab.) asked whether the experiments proceeding at the Fuel Research Station had given satisfactory results.

Mr. Joynson-Hicks said they had.

Automatic Train Control

Mr. Gerald Nabarro (Kidderminster—C.) on July 21 in the House of Commons inquired what progress had been made by the nationalised railways since the Harrow train disaster nearly two years ago, in the installation of appropriate track, signalling and locomotive equipment of new improved design, in addition to the experimental stretch between London and Huntingdon, for automatic train control in Regions other than the Western Region, which was already fully equipped; and whether he would make a statement.

Mr. Alan Lennox-Boyd (Minister of Transport & Civil Aviation) replied: The working of the British Railways A.T.C. apparatus now under trial has shown an appreciable improvement during recent months. Though the very high standard of reliability which is necessary in safety equipment of this kind has not yet been attained, the B.T.C. are proposing to extend the trial stretch for a considerable additional mileage. Later, he said that the B.T.C. had made its position perfectly plain, and the Government was supporting it in the view that a widespread extension of automatic train control was highly desirable, but the introduction of a system not wholly reliable would increase and not decrease the danger.

Mr. R. W. Williams (Droylsden—Lab.) inquired whether the Chancellor of the Exchequer was making a special allocation of money in order to encourage the B.T.C. to go on with the scheme with greater expedition than was now possible.

Mr. Lennox-Boyd replied that the B.T.C. had the requisite powers, but, quite rightly, it was proceeding by trial and error in this vital field where over-hasty improvisation might lead to disastrous results.

Staff & Labour Matters

Engineers' Wages

The agenda for the annual conference next month of the Confederation of Engineering & Shipbuilding Unions reveals a diversity of views amongst some of the affiliated unions on the question of engineers' wages.

The A.E.U., the largest affiliated union, suggests that first priority should be the formation of a new wage structure within the industry. This view is supported by the National Union of General & Municipal Workers. The Electrical Trades Union calls for an immediate application for a substantial rise in pay whilst the National Union of Vehicle Builders demands a 10 per cent increase in rates of pay. The Amalgamated Union of Foundry Workers asks for a wage policy which will overtake prices.

Contracts & Tenders

The Consolidated Railroads of Cuba have placed an order with General Motors Inc. for 51 875-h.p. diesel-electric locomotives. They will replace 137 steam locomotives, thus completing the change-over to diesel traction of the railway. Deliveries will begin this year and will be completed before the middle of 1955.

The Canadian National Railways have placed an order with the Budd Company for two diesel railcars: one RDC-1, an all-passenger unit seating 89 persons, and one RDC-4, a parcels and luggage car. They will operate together, replacing two steam-hauled passenger trains on the 115-mile route between Levis and Rivière de Loup.

Each car is of stainless steel construction and powered by two 275 h.p. diesel engines giving a top speed of 85 m.p.h.

British Railways, Southern Region, have placed the following orders:—

Aubrey Watson Limited, London, S.W.1: piling and strengthening of bridge abutments, Epsom, California Bridge

Johnson Brothers (Aylesford) Limited, Tonbridge: resurfacing and surface dressing of roads, footpaths and platforms at stations, Ashford District

A. Bagnall & Sons Ltd., London, W.12: renovations, High Brooms, Wadhurst and Stonegate Stations

Caffin & Co. Ltd., London, W.C.2: restoration after war damage, Wimbledon Station

Hunting Aerosurveys Limited, Boreham Wood: Salisbury to Axminster, aerial surveys

The Special Register Information Service, Export Services Branch, Board of Trade quotes a report by the British Embassy at Cairo that the latest date for the submission of applications from firms wishing to be included on the list of approved suppliers to the Egyptian Republic Railways has been postponed to January 1, 1955.

According to the Special Register Information Service, Export Services Branch, Board of Trade, the Department of Supply & Development, Government of Pakistan, Karachi, is calling for tenders for:—

150,000 steel trough sleepers for m.g. 60 lb. "R" rails

300,000 two-way steel keys for above

300,000 mills patent or similar spring steel loose jaws for above

Material manufactured by Thomas or Basic Bessemer process is not acceptable and quotations for this quality will be ignored.

The closing date for the receipt of tenders is August 10, and tenders should be submitted under sealed cover to the Director General of Supply and Development, Frere Road, Karachi. A set of the tender documents, without drawings, is available for loan to United Kingdom firms. A second set is available for immediate loan in order of application to the Branch (Lacon House, Theobalds Road, W.C.1).

The Special Register Information Service, Exports Services Branch, Board of Trade, reports that the Ports, Railways & Transport Department, Lourenço Marques, is calling for tenders for:

(*a*) 9,200 rails
(*b*) 18,400 fishplates
(*c*) 36,800 screws
(*d*) 330,000 augers
(*e*) 12 points (right)
14 points (left)

The latest date for receiving tenders is August 12. The following provisional deposits must be made by tenderers:—

	Escudos
Rails	300,000$00
Fishplates	12,000$00
Screws	2,500$00
Augers	25,000$00
Points	22,000$00

United Kingdom manufacturers are reminded that they cannot submit tenders direct but only through firms established in Mozambique, whose names are registered with the Stores Department of the Treasury, Lourenço Marques.

A copy of the tender documents (in Portuguese), including specifications and conditions of contract, may be had on loan from the Branch (Lacon House, Theobalds Road, W.C.1).

The Director General for Supplies & Disposals, New Delhi, invites tenders as follows:—

(*a*) 3,484 assorted manganese steel liners
874 tender front drag casting liners
(*b*) 2,700 axlebox bearings
(*c*) 496 axleboxes for locomotive bogie
140 clack boxes for top and side feed
(*d*) 760 axleboxes for locomotive coupled wheels

Tenders, quoting the following references, will be received up to 10 a.m. on (*a*) August 12; (*b*), (*c*) August 16; (*d*) August 17.

(*a*) SRI/17145—D/1
(*b*) SRI/16553—E/1
(*c*) SRI/16173—E/1
(*d*) SRI/16174 E/1

Forms of tender are only available for purchase in India from the Deputy Director General (Supplies), Directorate General of Supplies & Disposals, New Delhi; Director of Supplies & Disposals, Bombay or Calcutta; Deputy Director of Supplies & Disposals, Madras.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender forms may be examined at the India Store Department, 32-44, Edgware Road, London, W.2, on application to the "CDN" Branch. The drawings may be seen at the offices of Hodges, Bennett & Company, 59-60, Petty France, London, S.W.1, from whom copies may be obtained at a fixed price per sheet.

Notes and News

Crofts Engineers (Holdings) Limited.—Crofts Engineers (Holdings) Limited, of Thornbury, Bradford, have acquired the whole of the share capital of J. Parkinson & Son (Shipley), machine tool makers, the present directors, Mr. Edward Parkinson and Mr. Harry Parkinson, will continue to control the company under the existing management.

University of London, Department of Extra-Mural Studies.—A course of 24 weekly extension lectures on "Our Railway Heritage—Studies in Railway Geography and History" will be held at the City Literary Institute, Stukeley Street, Drury Lane, London, W.C.2, on Thursdays at 6.30 p.m., beginning on September 30. The fee for the course of 24 lectures is 10s. The lecturers are Messrs. C. Hamilton Ellis, C. E. R. Sherrington, and E. A. Course.

Glyn, Mills & Company.—The abridged statement of assets and liabilities of Glyn, Mills & Company for the year ended June 30, 1954, shows total assets of £67,201,798 against £70,186,752 for the previous year. Coin, bank notes, and balance with the Bank of England fell from £5,286,810 to £4,226,531, and balances with, and cheques in course of collection on, other banks in the British Isles rose from £3,993,435 to £4,594,842. Money at call and short notice amounted to £8,414,000, compared with £10,809,000 in the previous year.

London Midland Region Plans for August Bank Holiday.—The London Midland Region of British Railways is running more trains during this August Bank Holiday period than before. There will be 1,300 additional main line trains between July 29 and August 4. The busiest days will be July 31, with 253 extra trains, and August 2, when 281 additional trains will be provided for holidaymakers returning home. There will be 174 extra trains at Euston to and from the Midlands, North Wales, the North, and Scotland, and St. Pancras will have 134 additional trains to and from the Midlands and the North.

Future of the Locomotive Industry.—A statement issued recently, with the approval of Mr. Heathcoat-Amory, Minister of State, Board of Trade, disclosed that a special investigation is to be made into the prospects for diesel and steam locomotive orders in the traditional markets. The statement summarises replies made by the Minister to a delegation of Members of Parliament of the Amalgamated Engineering Union Parliamentary group, members of the executive council of the union, and officials and shop stewards from the works of the North British Locomotive Co. Ltd. It was stated that the home market depended on the British Transport Commission, which considered that it could, at present, build all the locomotives it required in its own workshops at economic prices. Markets in Russia and China were discussed, and the possibility of an order from the Chinese Government for 500 steam locomotives spread over a five-year period was mentioned as having been put to the North British Locomotive Co.

XUM

Ltd., although the Minister stated that he had no evidence that such an order was likely to be placed, and he expressed doubt of the Chinese ability to finance such an order.

August Bank Holiday Arrangements in the North Eastern Region. — Over the Bank Holiday period, British Railways, North Eastern Region, will run 290 special trains, including 146 excursions. There will be 72 relief trains from the West Riding, 27 being to London. From other parts of the North East there will be 33 main-line relief trains to London, with many trains to other destinations. The many excursions include 36 to Scarborough, while destinations vary from seaside resorts in the north east to Morecambe, Keswick, Belle Vue (Manchester), and Cleethorpes. Several race trains have been arranged. Seats are reservable in 58 relief trains, and refreshment car facilities will be available in 35, mainly on long-distance services.

Continental Services Poster.—The poster by Terence Cuneo reproduced below depicts Calais Maritime Station, with passengers disembarking from British Railways ss. *Invicta*, which has just berthed. Awaiting departure are the "Flêche d'Or" ("Golden Arrow"), for Paris, and the Anglo-Swiss express for Basle and beyond. The poster was produced by the Department of the Public Relations & Publicity Officer, Southern Region, with the co-operation of the French National Railways.

Level Crossing Accident in Germany.—A collision occurred on July 24 at Worms, in Germany, between a railway train and a bus. The bus was crossing the line at an unguarded crossing when it was hit by the train and carried some 70 yds. down the line. Eighteen of the 29 occupants, including the driver, were killed instantly and seven more died on the way to hospital. Two of the survivors were reported to be on the danger list the following evening. The driver and fireman of the train were uninjured except for shock. In a similar accident three years ago, 15 orphaned children were killed, and it is planned to equip all such crossings with barriers or to eliminate them by building bridges, but this programme will take some years to complete.

Western Region Railwaymen Mayors.—Ten of the eleven Western Region railwaymen who have been elected to the office of Lord Mayor or Mayor for the current civic year—a record number for the Region—were entertained by Mr. H. H. Phillips, Assistant Chief Regional Manager, at a luncheon at the Great Western Royal Hotel, Paddington, on July 20. They included the Mayors of Abergavenny, Aberystwyth, Shrewsbury, Newport, Oswestry, Slough, Hereford, Chippenham, Swindon, and Port Talbot; the Lord Mayor of Plymouth was unable to attend. Other chief officers were present at the luncheon.

Brush Group Overseas After-Sales Services.—Special additional service facilities to assist overseas sales were discussed at a recent conference held by the Brush Group Limited at Loughborough, on July 20. For many years, great attention has been paid to after-sales service by the individual companies of the Group (Brush, McLaren, Mirrlees, National, Petters, and Bryce Berger) and regular visits are made by individual service engineers attached to these factories. To augment the service given by individual factories, a new scheme has been introduced whereby a team of service engineers is now travelling overseas markets on behalf of the Group. These engineers are fully mobile and have a comprehensive knowledge of all the Group products. Their terms of reference are wide, and their main functions are to assist agents, to pay courtesy calls on customers, and to solve any service problems which arise during a particular visit. In addition, the Group service engineers have greatly helped overseas agents by training service mechanics on the staffs of agents, sub-agents, and regional distributors, and by educating customers in the most efficient use of their equipment.

Poster by Terence Cuneo showing passengers disembarking at Calais Maritime after arrival of the afternoon steamer from Folkestone. The train on the right is the "Golden Arrow" about to leave for Paris

Railway Benevolent Institution.—At a meeting on July 21 the board of the Railway Benevolent Institution granted annuities to nine widows, 11 members and allowances to two children, involving an additional liability of £420 per annum. Ninety-eight gratuities also were granted to meet cases of immediate necessity amounting to £875 6s. Grants made from the Casualty Fund during the month of June amounted to £547 2s.

Babcock & Wilcox Limited Factory in Brazil.—Babcock & Wilcox Limited is building a works at Rezende, Brazil, which is expected to begin manufacture in about a year. Raw material will be obtained locally; the Brazilian steelworks are at Volta Redonda and tubing and piping are being produced at Belo Horizonte. The factory will have its own machine shop and facilities will be introduced for fabricating steel structures as well as plating and framing work.

Road Accidents in May and June.—Casualties on the roads of Great Britain in June totalled 21,143. This was 533 more than in June of last year. Provisional figures give the number of killed as 364, and of seriously injured as 5,105, which is respectively 47 less and 21 more than for June last year. Final figures for May give a total of 20,013, including 372 killed and 4,767 seriously injured. In the first six months of this year there were 102,036 casualties, compared with 103,430 in the first half of 1953.

British Wagon Co. Ltd. Interim Dividends.—The British Wagon Co. Ltd. has declared interim dividends in respect of the year 1954, of 5s. per £20 share (£5 paid), and 1s. per £1 fully paid share, or 5 per cent in each case, comparing with 1¼ per cent a year ago. The intention of the board in making this increased payment is to lessen the disparity between the first and final payments and it is emphasised that it should not be interpreted as an indication of an increase in the total distribution for the year. For 1953 there was a second interim of 11 per cent and a bonus of 2½ per cent, to make a 15 per cent total.

Sigma Water Cooled Gun.—The Quasi-Arc Co. Ltd. is now sole licensee in this country for the Sigma welding process. This is an inert gas shielded consumable electrode process, for the welding of metals of poor weldability such as aluminium and stainless steel, using a water cooled gun. Water cooling allows the gun to be of very light, well balanced construction which reduces operator fatigue to a minimum and facilitates welding in the vertical and overhead positions. One trigger on the gun initiates the flow of water and argon shielding gas and also operates the main welding contactor, thus simplifying welding operations.

Western Region Bank Holiday Plans.—British Railways, Western Region, are to run more than 200 long-distance relief trains during the August Bank Holiday weekend, besides the augmented summer service which operates at weekends during the peak summer holiday period. These will include 112 special trains from and to Paddington and 97 on cross-country routes. Heavy traffic is expected to resorts in the

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SALES ENGINEER required for Company marketing diesel trains and trolley buses. Should have some technical training particularly with regard to diesel engines and transmissions. Commercial experience an asset, salary dependent upon experience. Box 295, *The Railway Gazette*, 33 Tothill Street, London, S.W.1.

TRAFFIC ASSISTANTS required for Central Railway of Peru and Guaqui-La-Paz Railway (Bolivia). Qualifications required: previous training in Railway Traffic Department of Transportation Company. Active and of first class health. Age 25/35 years. Preferably single. Knowledge of Spanish most desirable or willingness to learn within six months. Future prospects for right man willing to take opportunities. Apply, Secretary, Peruvian Corporation Limited, 144, Leadenhall Street, London, E.C.3.

GENERAL MANAGER required by Company manufacturing Diesel Electric Locomotives. Wide over-all experience in General Design, Production, Sales Organisation and Contract work essential. Applications in confidence to Box 3F.H.4071, A.K. Advertising, 212a, Shaftesbury Avenue, London, W.C.2.

BRITISH RAILWAYS—Southern Region. Electrical Engineering Technical Assistants are required for work connected with Electric Rolling Stock. General workshop experience an advantage. Applicants should not be more than 30 years of age and have a sound technical training having reached Higher National Certificate in Electrical Engineering standard, or equivalent. Commencing salary £350 p.a. at age 22 rising to £521 10s. p.a. at age 30. Applicants holding certain academic qualifications may receive up to £75 p.a. in excess of these rates. Applications in writing to be addressed to Mechanical & Electrical Engineer, 15, St. Thomas Street, London Bridge, S.E.1.

AMBITIOUS man, 25, desires managerial position, overseas railway. Oxford School Certificate. Graduate Institute Transport. Nine years Operating/Commercial experience stations/district offices British Railways. Box 299, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

DISTRICT INSPECTORS required by NIGERIAN RAILWAY for 12/24 months' tour either (*A*) with prospect of pensionable employment at salary (including expatriation pay) in scale £1,085 rising to £1,315 a year or (*B*) on temporary terms at salary (including expatriation pay) in scale £1,170 rising to £1,453 a year with gratuity at the rate of £150 a year. Commencing salary according to experience. Outfit allowance up to £60. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 annually towards maintenance in U.K. Liberal leave on full salary. Candidates of good education, should have had at least 12 years' all round experience of Railway commercial and operating duties. A good knowledge of the working of large stations and marshalling yards and of railway rules and regulations is essential. Candidates must be willing to accept responsibility and able to supervise staff. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M3B/34404/RA.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25*s.* per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press, Limited, 33, Tothill Street, London, S.W.1.

West of England, South and West Wales, and today (Friday) and tomorrow 24 relief trains will leave Paddington for these areas. A comprehensive programme of day and half-day excursions from all parts of the Region to seaside and inland resorts has been arranged. Normal advertised services will operate between Fishguard Harbour and Rosslare, Waterford and Cork over the weekend, with a special steamer from Fishguard to Rosslare tomorrow. Normal services will operate between Weymouth and the Channel Islands.

Sir Brian Robertson's Visit to West of England.—On July 26 and 27, Sir Brian Robertson, Chairman of the British Transport Commission, visited installations of the Western Region of British Railways; British Road Services, and B.T.C.-owned bus companies in the West of England. On the first day, after a conference at the District Commercial Superintendent's office at Bristol Temple Meads, he inspected Temple Meads Goods Station, the works of the Bristol Tramways & Carriage Co. Ltd., the British Road Services Depots at Bedminster, and Marsh Barton, near Exeter, and the Civil Engineer's Concrete Depot of the Western Region at Taunton. Visits were paid the next day to Newton Abbot Motive Power Depot, the Western National Bus Depot at Plymouth, and Millbay Docks. Sir Brian Robertson lunched on both days with officers of the Western Region and traders, and paid courtesy calls on the Lord Mayors of Bristol and Plymouth. Accompanying Sir Brian Robertson were: Messrs. J. L. Henderson, Parliamentary & General Officer, B.T.C.; H. H. Phillips, Assistant Chief Regional Manager; Gilbert Matthews, Operating Superintendent; A. C. B. Pickford, Commercial Superintendent; G. R. Smith, Chief Engineer; C. J. Ryder, Public Relations & Publicity Officer, Western Region.

Vent-Axia Limited Meeting.—The annual general meeting of Vent-Axia Limited was held on July 20, when Mr. J. C. Akester, Chairman & Managing Director, presided. In his circulated statement he said that the value of both home and export orders booked was higher than in the previous year, and current orders continued to show an upward trend. During the year ended March 31, 1954, the company acquired the entire issued capital of Axia Fans Limited. The number and type of orders in hand gave every confidence in the future. Group profit before taxation was £115,317, and after tax of £65,893 and costs relating to increased capital and so on, there was a net group profit of £44,115. Current assets exceeded current liabilities by £218,272.

Richard Costain Limited.—The statement by Sir Richard Costain, Chairman & Joint Managing Director of Richard Costain Limited, which was circulated with the report and accounts for the year ended December 31, 1953, gives details of civil engineering contracts which the firm has in hand, including a hydro-electric scheme in Scotland and a new airfield at Lydd. Opencast coal mining contracts are in hand, and a new building is being erected in Westminster Bridge Road which will provide office accommodation for the company. The subsidiary company, Costain Concrete Co. Ltd., is producing prestressed concrete sleepers for British Railways and turned out its millionth sleeper during the year. Other subsidiary companies are at work in many parts of the world, including Canada, Rhodesia, and West Africa, and an associated company is operating in Kuwait.

Firth Brown Tools Limited.—In his statement circulated with the report and accounts for the year ended March 31, 1954, Lord Aberconway, Chairman of Firth Brown Tools Limited, said that the cost of the wage award made in 1952 had had a marked effect on direct and indirect costs of manufacture. The company had decided to absorb these costs as far as possible so as to avoid inflation. The export trade of the company was substantial, and to maintain markets a high standard of quality, reasonable delivery times, an energetic and efficient selling organisation, and competitive prices were the factors needed. The last factor could be nullified if it was not recognised how damaging to export sales were continuing wage demands. The report was adopted at the annual meeting on July 22. Financial results were given briefly in our issue of July 23.

Morgan Crucible Co. Ltd.—In his circulated statement to shareholders, Mr. P. Lindsay, the Chairman of the Morgan Crucible Co. Ltd., says that, in the year ended March 31, 1954, there was an improvement in the climate of British trade, despite the opposite trend in the U.S.A. The improvement came towards the end of the calendar year, and as a result the company's order book is in a better state than at the corresponding time last year. The year's sales turnover did not reflect this improvement because, not only did it come late in the year, but there was an avoidable lag between sales expansion and factory output. The fall in foreign sales, in spite of the difficulties confronting the British exporter, was less than that of home sales. Improved results are expected in the current year, and trade has proved better than expected. Contributory factors are the more favourable money market, expansion of gold reserve, and a delayed stimulus from improvement in the terms of trade.

General Electric Co. Ltd.—A recovery in earnings and a final dividend of 8¾ per cent against 7½ per cent, making 12½ per cent compared with 11¼ per cent, are announced by the General Electric Co. Ltd. Group profit, before tax, increased by £1,547,684 or 37 per cent to £5,777,918, and although tax absorbs £550,054 more at £3,053,711 the net profit was almost doubled at £2,364,345, against £1,266,054.

Charles Roberts & Co. Ltd. Final Dividend.—A final dividend of 6⅔ per cent on the ordinary capital of £1,000,000, as increased in March by 66⅔ per cent scrip issue, is to be paid by Charles Roberts & Co. Ltd., on September 2. A 10 per cent interim dividend was paid on £600,000 ordinary capital before a cash payment of 66⅔ per cent not subject to tax and a 66⅔ per cent scrip issue. For 1952-53, on £600,000, an interim and final dividend of 10 per cent each, less tax, were paid, also a "special" of 100 per cent not subject to tax. The untaxed group profit for the year to March 31, 1954, is £318,350, against £321,546. The net retainable profit is £83,675 (£111,584) after tax provision of £234,675 (£209,962).

Murex Limited Results.—The directors of Murex recommend a final ordinary dividend of 9 per cent, making a total of 15 per cent for the year ended April 30, 1954. The same rate was paid for the previous year, but the interim dividend was on smaller capital. Group profits were £657,000, compared with £705,000 for the previous year. Taxation at £390,000 (£311,000), after deducting overprovision of £78,000, left group net profits of £267,000 (£393,000). Dividends absorb £192,000 (£182,000). The directors point out that trading profits, disregarding the

fortuitous element, showed a decrease of some 14 per cent compared with the year before. Replacement of fixed assets reserve receives £125,000 (£155,000). Last year £182,000 was placed to general reserve. A sum of £50,000 (£120,000) has been transferred from stock contingency reserve to cover losses on turnover of stock during the year.

John Brown & Co. Ltd. Canadian Purchase.—John Brown & Co. Ltd. announces that it has acquired control of A. C. Wickman (Canada) Limited, specialists in the manufacture of tungsten carbide equipment and agents for high-production machine tools.

Institution of Mechanical Engineers: Change of Address.—The recent renaming of streets by the London County Council has resulted in the address of the Institution of Mechanical Engineers being changed. The premises will in future be known as No. 1 Birdcage Walk, Westminster, London, S.W.1.

Sleeping-Car Special for Dance Guests.—A special train which left Euston on July 23 to carry some 80 guests to a private dance was composed of two restaurant and five sleeping cars. The guests travelled to Alrewas, the nearest station to Wychnor Park, where the dance was held. The train was available from 3 a.m. next morning for guests to rejoin it and left on the return journey at 11.30 a.m.

Holiday Period Tickets from Euston to Selected Resorts.—On Saturday, August 28 and September 4, 11, 18 and 25, reductions of between £1 and £1 10s. on the third class return fares will be given from Euston to some North Wales resorts and Morecambe by selected express services only. The London Midland Region points out that the number of bookings on each service will be limited.

Increased Efficiency of Osram Tubes.—The General Electric Co. Ltd. has increased the light output for the first 5,000 hours of life of the 5 ft. 80 Watt, and 4 ft. 40 Watt sizes of the fluorescent tubes from 2,720 to 3,120, and 1,520 to 1,640 lumens, respectively. The light output of the Osram 8 ft. 125 W. tubes in the new warm white colours is 6,875 lumens for the first 5,000 hr., and efficiency of 55 lumens per watt. It is said that this type, first introduced in March this year, has colour-rendering properties, and provides a good match for tungsten lighting. It is suitable for commercial and industrial undertakings.

Barsi Light Railway Co. Ltd. Results.—No ordinary dividend is recommended by the directors of the Barsi Light Railway Co. Ltd. for the nine months ended December 31, 1953, after which the railway was taken over by the Government of India. A total of 4 per cent was paid for the previous year. There was a loss on net earnings of Rs. 2,43,773 against a profit of Rs. 10,62,965 in the previous year. Expenditure for the nine months included, *inter alia*, a special item of over Rs. 2,00,000 in respect of accrued leave pay and gratuities to those employees not taken into Government service.

Davey, Paxman & Co. Ltd. Results.—The net profit for the year to March 31 last of Davey, Paxman & Co. Ltd., was £368,842, compared with £313,250 for the previous year. This was after charging depreciation and so on and after providing £423,510 (£348,030) for taxation The ordinary ing £280,000 (£240,000) to general reserve (in the previous year £14,000 was placed dividend is 25 per cent (15 per cent), absorbing £72,187 (£43,312). After placto employees' "Coronation" bonus reserve) the balance carried forward was £67,301, compared with £59,309 brought in. At the year end net current assets amounted to £2,152,000 (£1,887,000).

Hackbridge & Hewittic Electric Co. Ltd.—At the annual general meeting of the Hackbridge & Hewitt Electric Co. Ltd. in London on July 26, Mr. Douglass Hewitt, presiding, said that group trading profits for the year ended March 31, 1954, were £504,000, an increase of £44,000, reflecting a considerable increase in output and deliveries. Large rectifier installations put into service included eight substations of an order for 28 for British Railways, Southern Region, and a changeover scheme at Bond Street, London Transport. The order book was satisfactory, but import and financial restrictions shut off the firm from some traditional overseas markets. All measures were being taken to meet keen competition, particularly from Continental manufacturers. The sum of £212,500 was available, after bringing forward last year's balance. The directors recommended payment of a final ordinary dividend of 20 per cent, making a total of 25 per cent, less tax, for the year.

Forthcoming Meetings

August 18 (*Wed.*) to August 28 (*Sat.*).—"The Model Engineer" Exhibition at the New Horticultural Hall, London, S.W.1.

Until September 25 (*Sat.*).—"Popular Carriage" Exhibition (Two centuries of carriage design for road and rail) in the Shareholders' Meeting Room, Euston Station, London, N.W.1. Weekdays 10 a.m. to 7 p.m.; Sundays 2 to 7 p.m.

Railway Stock Market

The latest turn in international affairs made for caution in stock markets, and although prices were easier both in the gilt-edged and industrial sections, not much selling was in evidence. Buyers adopted a wait-and-see attitude; but the fact that there has been little disposition to take the big profits represented by the rise in market values this year, is an illustration of the confident views in evidence. It is recognised that very serious developments in international affairs would cause a sharp reaction in markets because they would be vulnerable if heavy selling developed, bearing in mind the big rises this year.

Investors generally seem to be optimistic regarding international prospects as well as in other matters. Sentiment is still buoyed up by the assumption that a cheaper money policy, with a cut in the bank rate to 2½ per cent, are in prospect, and it continues to be assumed that many industrial companies will again raise dividends next year, when results will be the first to benefit from the end of E.P.L. There is, however, a factor which may tend to quieten markets, namely, the appearance of important new issues which will be a strong competitor for investment money. Both British Electricity and British Gas are expected to make new issues and a number of big industrial offers of importance are in prospect.

Foreign rails were very quiet this week, though activity continued in Dorada ordinary stock, which changed hands around 85 on future take-over possibilities.

United of Havana stocks were inactive, but a little firmer after the official statement, the second income stock being 36¼ and the consolidated stock 5⅝.

Antofagasta ordinary and preference have been steady at 8½ and 41 respectively, while Manila ordinary shares remained at 9s. 3d. and the preference at 19s. 1½d. Mexican Central "A" debentures were 73½ and San Paulo ordinary units 3s. 6d. Nitrate Rails shares were 20s. 3d.

Canadian Pacifics strengthened to $47¼, while the 4 per cent preference stock and 4 per cent debentures were £68¼ and £90¼ respectively. White Pass no-par value shares were dealt in around $24¾.

Elsewhere, Chilian Northern mortgage debentures have changed hands around 28. Costa Rica ordinary stock was 8 and the first debentures 62, while Guayaquil & Quito first bonds transferred around 56. International of Central America stocks again remained firmly held and rarely changed hands. The gold bonds were last dealt in at 124 and the no-par value shares at $10¼. Paraguay Central prior debentures were 20½ and the "A" debentures 12½. Taltal Railway shares were quoted at 13s.

Among Indian stocks, Barsi changed hands at 104½. West of India Portuguese capital stock remained at £91.

Midland of Western Australia was 21 and the 4½ per cent first debentures 92½. Nyasaland Railways 3½ per cent debentures were 79½ and the £1 ordinary shares quoted at 4s. 6d.

Among road transport shares there were again few sellers and prices held firm, as usual. Southdown were 31s. 6d., and West Riding were also at this level, while Lancashire Transport have changed hands around 59s. Potteries Motor Traction were quoted at 30s., Ribble Motor at 36s. 3d. and Trent Motor Traction were 36s. 1½d. British Electric Traction 5s. "A" deferred units, after rising to 60s. on Mr. Drayton's statements at the annual meeting, eased later to 59s. 4½d.

Engineering and kindred shares have been firmer for choice. The buying of shares of companies likely to play a growing part in the development of atomic energy for industrial purposes has been a minor feature. Babcock & Wilcox were up to 62s. Guest Keen firmed up to 59s. 10½d., but Murex eased to 51s. 9d. on the results, and John Brown came back to 37s. 6d., despite the unchanged 7½ per cent tax free dividend. Vickers were active and strengthened to 33s. in the belief that, if additional capital is required, shareholders will be given preferential allotment. General Electric at 50s. have moved higher on balance, the increased dividend of 12½ per cent being in accordance with best expectations.

Among shares of locomotive builders and engineers, Beyer Peacock were 40s., but Charles Roberts 5s. shares eased to 9s. 10½d. on the results. Birmingham Carriage were 27s. 7½d., Hurst Nelson 42s. at Glasgow, and North British Locomotive 16s. 9d. Elsewhere, Vulcan Foundry were 27s. 6d., Gloucester Wagon 10s. shares 18s. 9d. and Wagon Repairs 5s. shares 14s. 1½d. G. D. Peters were quoted at 21s. 10½d.